Statistical Series **57**

Field Surveillance Provincial Summary

April 2000/March 2001

Alberta Energy and Utilities Board

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Executive Summary

Staff at the EUB's eight Field Centres inspect and monitor Alberta's thousands of oil and gas facilities. These field representatives are an important part of the broad energy regulatory program that involves industry, government, and the public.

The EUB's annual *Field Surveillance Provincial Summary* details the wide range of activities carried out by the EUB field staff. The report provides stakeholders with information on industry compliance and EUB enforcement action, shows trends, and assists the EUB in planning its inspection and enforcement strategies.

As well as opening a field suboffice in High Level in 2000/2001, the EUB added 12 new field staff allowing it to keep pace with record drilling activity in Alberta. There were 14 621 wells drilled, a 27 per cent increase over the 11 548 wells drilled in 1999/2000. Further planned additions to field staff in 2001/2002 reflect a desire to ensure that the right emphasis is placed on the EUB's surveillance and enforcement roles and will help the EUB maintain its focus on high-risk operations, operators with poor performance history, and sensitive areas of development.

In a year when activity levels were at a record high and the EUB introduced many new requirements, the industry managed a slight overall improvement it its compliance record. This is evidenced by an increase in the percentage of satisfactory inspections and a decrease in the percentage of minor, major, and serious unsatisfactory inspections.

Albertans can be assured that firm enforcement action will be taken when an operator breaks the rules. The EUB's objective is to ensure that the energy industry understands and follows rules so that Albertans can be confident that oil and gas companies operate responsibly in ways that protect people, preserve the environment, and allow for the efficient and orderly development of our resources.

Inspections

There are hundreds of requirements in each inspection area monitored by the EUB. Where even one noncompliance item is found—no matter how "minor" in nature the item may seem—the inspection is deemed unsatisfactory, and a company is put on an enforcement ladder of escalating consequences.

- The total number of initial field inspections in 2000/2001 increased to 8279 from 7340 in 1999/2000 (see Table 1). This reflects the EUB's planned expansion of inspection activities set out in its 2000-2003 business plan.
- In addition to the 8279 initial inspections, field staff completed 2053 reinspections.
- Overall, satisfactory inspections increased slightly to 64 per cent, from 63 per cent in 1999/2000.
- Major/serious unsatisfactory inspections were further reduced in 2000/2001 to 3.3 per cent, from 3.5 per cent in 1999/2000 and 5.6 per cent in 1998/1999.

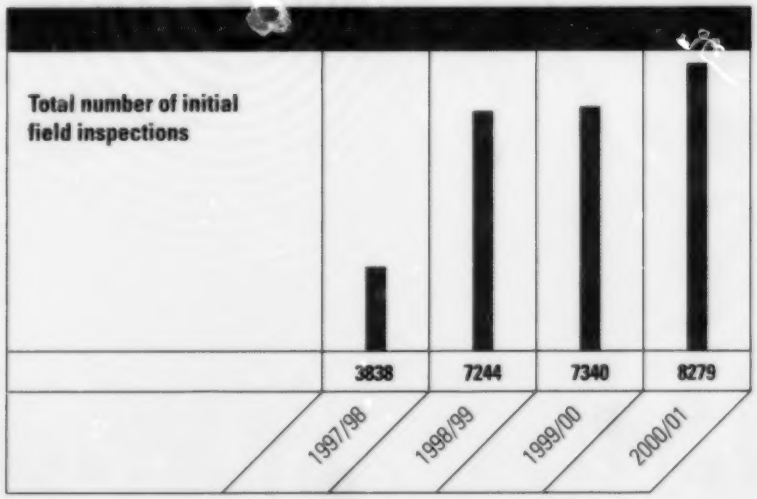
Table 1. Field inspections[1]/investigations, 2000/2001

	Initial	Satisfactory	Minor unsatisfactory	Major unsatisfactory	Serious unsatisfactory	Reinspection
Drilling rigs	648	568	39	41	0	0
Service rigs	348	303	31	14	0	0
Oil production facilities	3 786	2 264	1 425	97	0	1 607
Gas production facilities	968	611	328	29	0	343
Pipeline construction/testing	607	503	91	13	0	44
Pipeline failure inspections	482	N/A	N/A	N/A	N/A	N/A
Pipeline operations inspections	275	95	159	21	0	59
Pipeline contact damage inspections	97	N/A[2]	N/A	35	3	0
Spill inspections	752	711	29	12	0	0
Waste management facilities	56	28	23	4	1	0
Drilling waste management						
Nonroutine inspections	91	78	9	4	0	0
Routine inspections	169	127	N/A[3]	N/A	N/A	N/A
TOTAL	8 279	5 288	2 134	270	4	2 053

[1] For definitions of minor, major, and serious unsatisfactory inspections, see Section 1.3 (page 4). Note that details for each inspection category are found in various sections throughout this report.

[2] Contact damage incidents—categorization of contact damage incidents that are not major or serious unsatisfactory inspections will be addressed in the forthcoming new pipeline inspection manual.

[3] Unsatisfactory routine drilling waste disposal inspections do not distinguish among minor, major, and serious; therefore, they are not included in this table.



- Out of the total 8279 initial inspections conducted, the EUB identified 4 serious unsatisfactory inspections, compared to 5 in the previous year. Three of these unsatisfactory inspections related to pipeline hits and one involved a waste management facility. Operations at all facilities were shut down until corrections were made.

Drilling

In 2000/2001, EUB field staff conducted 648 inspections on drilling operations, resulting in

- 568 satisfactory inspections (87.7 per cent, up from 87.1 per cent in 1999/2000)
- 39 minor unsatisfactory inspections (6.0 per cent)
- 41 major unsatisfactory inspections (6.3 per cent)

Drilling operations were suspended at all rigs with major unsatisfactory items until they were corrected. This resulted in 41 shutdowns.

During the drilling of 14 621 wells in 2000/2001, there were four blowouts, six blows, and 162 kicks recorded, or 11 kicks per 1000 wells drilled (for definitions, see page 16). The kick occurrence rate has remained relatively constant for the last four years and is a significant improvement from the years prior to 1997/98, when the kick occurrence rate averaged 23 kicks per 1000 wells drilled.

Servicing

In 2000/2001, EUB staff conducted 348 inspections on well servicing operations, resulting in

- 303 satisfactory inspections (87.1 per cent, down from 89.7 per cent in 1999/2000)
- 31 minor unsatisfactory inspections (8.9 per cent)
- 14 major unsatisfactory inspections (4.0 per cent)

Servicing operations were suspended at all rigs with major unsatisfactory items until they were corrected. This resulted in 14 shutdowns.

A total of four blowouts and one blow occurred in well servicing operations in 2000/2001.

Oil and Gas Production Facilities

EUB staff conducted a total of 6704 inspections and reinspections of oil and gas production facilities in 2000/2001. This is an increase over the 6412 inspections and reinspections conducted in 1999/2000.

Continuing a downward trend in the percentage of major unsatisfactory inspections for oil production facilities, there were 103 major unsatisfactory items identified (or 1.9 per cent, a decrease from 2.3 per cent in 1999/2000). Appropriate enforcement action was taken to bring facilities into compliance, and 34 oil production facilities were suspended as a result.

Major unsatisfactory inspections accounted for 3 per cent of all gas facility inspections completed in 2000/2001, an improvement over the 4 per cent in 1999/2000. EUB field staff suspended seven facilities until improvements were made to ensure that the facilities were properly operated.

The EUB found increased sulphur recovery efficiencies at gas plants (98.8 per cent in 2000, compared to 98.7 per cent in 1999).

Pipelines

No matter how small a leak, if a pipeline failure occurs, the licensee or operating company is required to inform the local EUB Field Centre. (For definitions of pipeline failure, hit, leak, and rupture, see Section 5.2, pages 38-39.)

Over the last decade there has been a significant reduction in the overall pipeline failure frequency. In 2000, the ratio decreased to 3 failures per 1000 kilometres (km) of pipeline from 5 failures per 1000 km in 1988. The majority of failures occur on small-diameter water lines and multiphase oil effluent (a mix of oil, water, and gas) lines.

- There were fewer pipeline ruptures than in the previous year: 39 ruptures in 2000/2001, compared to 44 in 1999/2000.

- Of the total pipeline incidents reported during 2000/2001, 89.6 per cent were leaks, 4.1 per cent were ruptures, and 6.3 per cent were hits that did not result in a release.

- 77.6 per cent of releases were classified as priority 3. Priority 3 releases have minimal potential for hazard or environmental impact and do not require inspection.

- The decrease in the number of priority 1 releases, which require immediate response, may be attributed to the use of sensitive leak detection systems, automated shut-in equipment, and pipeline patrols (aerial and ground). 1.7 per cent of releases were classified as priority 1.

- There was an increase in corrosion failures. Most of the leaks were on sweet gas pipeline systems in southeastern Alberta. These types of leaks are typically very small in volume and difficult to detect under normal operating conditions. Investigations of first-time corrosion failures on systems ensure that corrosion problems are analyzed and adjustments made to reduce future failures. The EUB has also established a corrosion team to review requirements and examine all opportunities for avoiding corrosion.

- The EUB responded to a greater number of contact damage hits, largely attributed to increased development. There were 97 in 2000/2001, compared to 68 in 1999/2000. The goal of this surveillance area is prevention of hits. EUB staff conduct ground disturbance seminars for companies in violation of requirements and others undertaking ground disturbance operations, and the Field Surveillance Branch continues to investigate ways to reduce pipeline hits.

Spills

The ideal situation would be the elimination of all spills. Notwithstanding that desire, the EUB's goal is to minimize the effects of spills and releases by working cooperatively with industry and other regulators.

Releases must be reported to the EUB to allow for an appropriate, timely, and effective response. Failure to do so results in escalating consequences through the EUB's enforcement ladder process, which may include suspension of operations.

A total of 1475 releases was reported to the EUB in 2000/2001, up from 1318 the previous year. The 752 inspections conducted by the EUB resulted in

- 711 satisfactory inspections
- 29 minor unsatisfactory inspections
- 12 major unsatisfactory inspections

During 2000/2001, more than 70 per cent of the spills were low volume and were usually contained on lease with minimal impact on the surrounding environment.

Although the number of spills reported increased over 1999/2000, spill volumes decreased:

- Spill volumes for oil were 6469.1 cubic metres (m^3) in 2000/2001, compared to 7247.1 m^3 in 1999/2000, a decrease of 10.7 per cent.
- Spill volumes for water were 22 874.1 m^3 in 2000/2001, compared to 23116.7 m^3 in 1999/2000, a decrease of 1.0 per cent.

Enforcement

The EUB has an enforcement process that sets clear guidelines for action when dealing with regulatory noncompliance. This process, known as the enforcement ladder, allows the EUB to take a firm, fair, and consistent approach. Enforcement actions always include deadlines for fixing a problem and may be reinforced by penalties, such as temporary or long-term suspension of operations, closure or refusal of applications, and even prosecution.

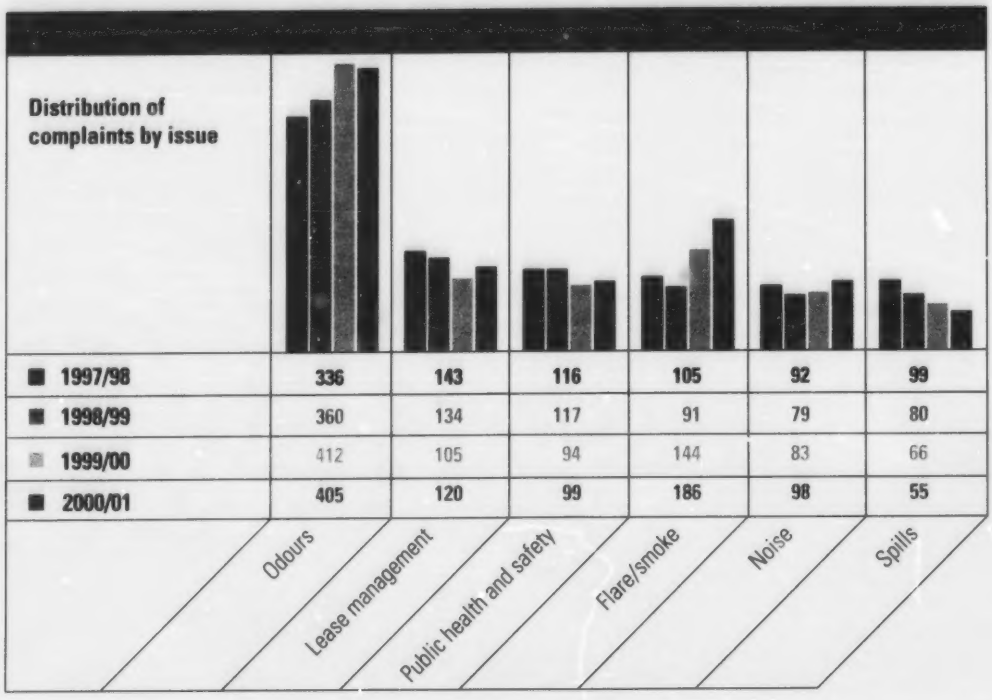
There was a significant increase in the estimated cost to industry as a result of EUB suspensions of industry operations: approximately $12 million in 2000/2001, compared to $3.6 million in 1999/2000, with the number of suspensions increasing to 236 from 211.

Public Complaints

Along with the record amount of energy development activity in 2000/2001, the EUB recognized an associated increase in public concerns. The EUB places a high priority on addressing these public concerns. Field Surveillance staff respond to all complaints, aiming to ensure prompt, effective, and lasting resolution of any problem identified.

During 2000/2001, the EUB received and responded to 924 complaints, compared to 859 in the previous year.

Complaints related to odours and spills were down, by 2 per cent and 15 per cent respectively. However, there was an increase in the number of complaints related to flaring, noise, and public health and safety. The EUB is confident that its effort on major initiatives, such as work currently under way to address 87 recommendations of the Advisory Committee on Public Safety and Sour Gas and its development of requirements in connection with the Clean Air Strategic Alliance to target reductions in flaring, will help ease public concerns related to flaring and public health and safety.



Results from the complaint-handling follow-up process indicate a decrease in customer satisfaction:

- Overall, 65 per cent of incidents were resolved to the satisfaction of the complainants, compared to 81 per cent in 1999/2000.
- 66 per cent were satisfied with the companies' responses, compared to 89 per cent in 1999/2000.
- 86 per cent were satisfied with the response form the EUB, compared to 99 per cent in 1999/2000.

The EUB attributes some of the decrease in customer satisfaction to new requirements regarding flaring and expectations around public consultation regarding flaring matters. Many of the public complaints and concerns reflect these new consultation requirements. The Field Surveillance Branch is investigating ways to improve customer satisfaction. The addition of new field staff, along with the progress on the EUB's public safety and flaring initiatives described above, will assist the EUB in effectively addressing complaints.

Stakeholder Involvement

Field Surveillance staff were involved with 177 facilitations in which EUB staff coordinated discussions among affected parties who find themselves on opposite sides of a development issue. Of these facilitations, 105 were successfully resolved and 22 were candidates for Appropriate Dispute Resolution (ADR). Facilitation efforts are ongoing with the remaining 50.

The EUB's ADR process appears to be effective in resolving issues. Results to date indicate that of the 7 third-party mediations that completed the process, 5 were successfully resolved and 2 have gone to hearing. Mediation is ongoing for the remaining 12.

The number of synergy groups formed by affected individuals and companies with common interests in local issues of energy development continues to increase. Currently EUB field staff participate in most of the 67 synergy groups in the province. The EUB endorses their cooperative approach as an effective way to improve communication and address issues.

Field Surveillance will continue to hold open houses in 2001/2002 as an effective means for communicating with stakeholders.

Red Deer Field Centre staff conducting inspection in manifold building at the drilling rig

1 Summary of Inspections, Enforcement, Public Complaints, Stakeholder Involvement Efforts, and Major Initiatives

1.1 Introduction

This *Provincial Summary* report provides stakeholders with key information and statistics related to the activities of the Alberta Energy and Utilities Board's (EUB) Field Surveillance Branch. Analyses of the data indicate trends and are used in determining resource allocation and future Field Surveillance action to improve industry compliance with EUB requirements.

The EUB's Field Surveillance Branch has eight Field Centres located throughout the province. In addition, a suboffice of the Bonnyville Field Centre is located in Fort McMurray and a suboffice of the Grande Prairie Field Centre was recently opened in High Level (see Figure 1).

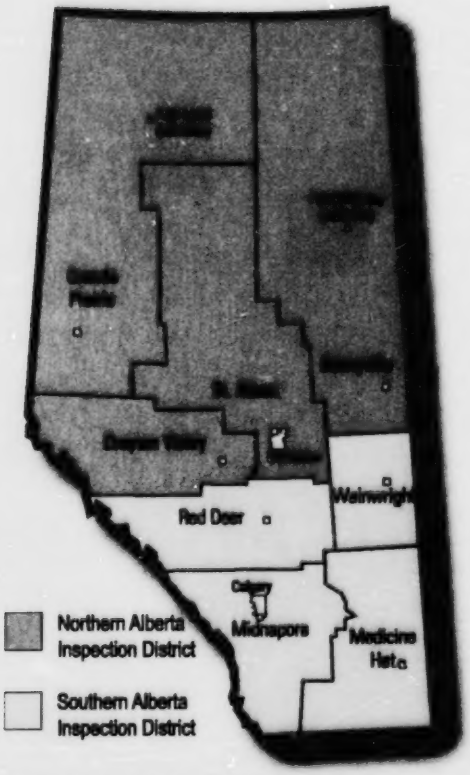


Figure 1. EUB field centre boundaries

1.2 Role of Field Surveillance Staff

As part of the EUB's overall surveillance and enforcement role, field staff

- respond to and address complaints about energy development and environmental issues;
- inspect drilling and service rigs, oil and gas production facilities, and pipelines to ensure that companies comply with all applicable standards, specifications, and approval conditions;
- take enforcement action when noncompliance occurs;
- focus on problem operators with poor inspection records with a view to long-term improvements;
- concentrate on higher-risk facilities, such as sour gas wells, pipelines, and plants;
- respond to oil and gas emergencies, monitor the cleanup of spills, and evaluate preventive measures;
- attend meetings with citizens and operators to assist in resolving issues;

- participate in community meetings to answer questions and provide information about the EUB's regulatory process; and

- educate industry on new and revised requirements.

The sections below summarize Field Surveillance Branch inspections, enforcement, handling of public complaints, stakeholder involvement activities, and other key initiatives.

1.3 Inspections

EUB field inspections are prioritized based on the weighting of three key criteria, known as OSI: *operator* history, site *sensitivity*, and *inherent* risk of the facility/operation. Field staff focus on operators with previous unsatisfactory inspections, including repeated noncompliance. Sensitivity of the area where the operation is taking place is also reviewed and includes items such as proximity of the operation to the public or water bodies and areas with significant public concern regarding oil and gas operations. The inherent risk of a facility or operation is determined by reviewing specific technical details about the facility, such as the complexity of the operation and whether the facility is sweet or sour.

The total number of initial field inspections increased from 7340 during 1999/2000 to 8279 in 2000/2001 (note that spill inspections and contact damage inspections were not included in the 1999/2000 year's results but are included for 2000/2001). The percentage of satisfactory inspections increased slightly, from 63 to 64 per cent. The minor unsatisfactory inspection percentage remained relatively constant, at about 26 per cent, and the overall percentage of major and serious unsatisfactory inspections fell from 3.5 per cent in 1999/2000 to 3.3 per cent in 2000/2001.

EUB Action

- There continue to be increasing demands on EUB field staff to ensure that industry's compliance record improves. More resources are required to assist the public and industry in the area of facilitation[1] and the development of effective synergy groups[2] to address regional issues. Twelve staff were added to last year's Field Surveillance Branch complement. Six additional staff will be added in 2001/2002, which will bring the staff to 109. This increase will be used to monitor and improve industry compliance and assist with the increased demands in the facilitation and synergy group areas.

Throughout this report, the terms "satisfactory" inspection, "minor," "major," and "serious" unsatisfactory inspections are used. It is important that the definition of each is understood to properly interpret the statistics. There are numerous requirements in each

[1] When members of the public have concerns about a particular industry project and the parties are having difficulty resolving issues on their own, Field Surveillance staff facilitate the resolution process. EUB staff assist to improve communications, information sharing, and identification of issues and options available and to ensure that EUB requirements are understood.

[2] To ensure that the impact of resource development and operations is minimized on an ongoing and proactive basis, synergy groups are formed to identify issues and work on collaborative solutions to the problems identified. Synergy groups usually involve public, industry, and appropriate government representatives. EUB staff assist and support the organization of these groups, but the strength and success of the groups lie in the direct involvement of participants.

inspection discipline, and if even one noncompliance item is identified, the inspection is considered unsatisfactory. The definitions below include those of minor, major, and serious unsatisfactory event/inspection from *Informational Letter (IL) 99-4: EUB Enforcement Process, Generic Enforcement Ladder, and Field Surveillance Enforcement Ladder* and apply to these terms used throughout this report.

- **satisfactory event/inspection**—an inspection where all regulations/requirements are met by industry

- **minor unsatisfactory event/inspection**—a contravention of regulation(s)/ requirement(s) that does not result in a direct threat to the public and/or the environment and does not adversely affect oil and gas operations

  Examples of minor unsatisfactory inspection items are

  - pipeline signage missing, defaced, or displaying incorrect information, and
  - garbage and debris not stored in a reasonable manner at an oil or gas facility.

- **major unsatisfactory event/inspection**—a contravention of regulation(s)/ requirement(s) that an operator has failed to address and/or has the potential to cause an adverse impact on the public and/or the environment

  Examples of major unsatisfactory inspections items are

  - failure of blowout prevention (BOP) equipment on a drilling or service rig, and
  - a hydrogen sulphide release causing odours off lease at an oil battery.

- **serious unsatisfactory event/inspection**—a total disregard for regulation(s)/ requirement(s) that is causing or may cause a significant impact on the public and/or environment

  Examples of serious unsatisfactory inspection items are

  - BOP equipment missing where required on a drilling or service rig, and
  - unaddressed release into water, operator aware, but no action taken.

Table 1 summarizes the field inspections that occurred in 2000/2001 and includes the number of initial[3] inspections and reinspections[4] in each category. Each inspection category includes the number of satisfactory, minor, major, and serious unsatisfactory inspections.

[3] An initial inspection is the first inspection on a facility in a designated time period.
[4] A reinspection is a follow-up to a deficiency found at a facility during the initial inspection.

Table 1. Field inspections[1]/investigations, 2000/2001

	Initial	Satisfactory	Minor unsatisfactory	Major unsatisfactory	Serious unsatisfactory	Reinspection
Drilling rigs	648	568	39	41	0	0
Service rigs	348	303	31	14	0	0
Oil production facilities	3 786	2 264	1 425	97	0	1 607
Gas production facilities	968	611	328	29	0	343
Pipeline construction/testing	607	503	91	13	0	44
Pipeline failure inspections	482	N/A	N/A	N/A	N/A	N/A
Pipeline operations inspections	275	95	159	21	0	59
Pipeline contact damage inspections	97	N/A[2]	N/A	35	3	0
Spill inspections	752	711	29	12	0	0
Waste management facilities	56	28	23	4	1	0
Drilling waste management						
Nonroutine inspections	91	78	9	4	0	0
Routine inspections	169	127	N/A[3]	N/A	N/A	N/A
TOTAL	8 279	5 288	2 134	270	4	2 053

[1] For definitions of minor, major, and serious unsatisfactory inspections, see Section 1.3. Note that details for each inspection category are found in various sections throughout this report.

[2] Contact damage incidents—categorization of contact damage incidents that are not major or serious unsatisfactory inspections will be addressed in the forthcoming new pipeline inspection manual.

[3] Unsatisfactory routine drilling waste disposal inspections do not distinguish among minor, major, and serious; therefore, they are not included in this table.

1.4 Enforcement

The Field Surveillance Branch has developed generic enforcement ladders to ensure that a firm, fair, and consistent approach is taken in all noncompliance situations. Enforcement actions escalate to a higher level if a company repeatedly fails to meet EUB requirements.

This enforcement process

- improves EUB staff consistency, efficiency, and effectiveness;
- results in increased public safety, minimizes environmental impacts, and improves conservation;
- helps create a level regulatory playing field for industry; and
- improves EUB and industry accountability.

Companies that fail to meet requirements or follow EUB direction are subject to escalating enforcement consequences. A company's required response to EUB direction and subsequent continued compliance with regulations result in its compliance status reverting back to satisfactory.

Table 2 summarizes the oil and gas operations that were shut down in 2000/2001 as a direct result of EUB enforcement action and the estimated cost to industry (also see Figure 2).

Table 2. Facilities/operations shut down at EUB Field Surveillance request, April 1, 2000, to March 31, 2001

Type	Approximate number of suspensions	Average duration of shutdown	Estimated amount of deferred cash flow[1] ($)	Estimated cost ($)	Most common reasons for suspensions
Drilling rigs	41	3.2 hours		108 750	• Operational failure of BOP/accumulator system • Crew training
Service rigs	14	3.2 hours		9 300	• Operational failure of the accumulator system
Oil production batteries	34	22.6 days	1 144 260		• H_2S emissions • Spills
Gas facilities	7	32 days	380 026		• H_2S emissions/excessive flaring
Pipelines under construction	24	6.75 days	N/A	405 000	• Ground disturbance activities
Pipelines in operation	58	31 days	590 000	9 380 000	• Corrosion integrity work
Injection wells, disposal wells	58	Not calculated	N/A	Not calculated	• Failure to submit packer isolation tests
Subtotal			2 114 286	9 903 050	
TOTAL	236			12 017 336	

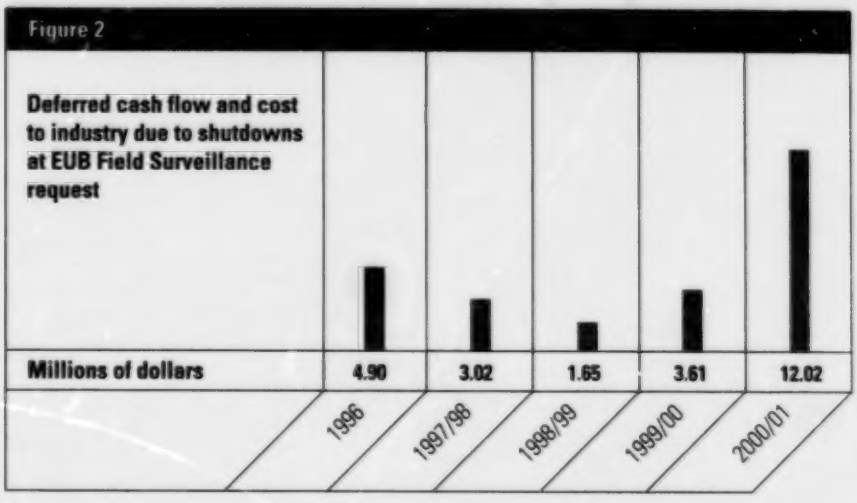
[1] Compiled using data from EUB field centres. Where direct estimates were not available from the involved companies, cost estimates were as follows: $750/hour for drilling rig time; $300/hour for service rig time; $260/$m^3$ for value of conventional/bitumen oil production; $250/10^3 m^3$ for value of gas production; and $250/hour for pipeline construction down time. Costs of suspensions are as supplied by industry where available. Where necessary, costs were calculated from production reports.

1.5 Public Complaints

1.5.1 EUB Response to Public Complaints

Energy exploration and development activity were high in 2000/2001. The EUB recognizes that with this activity level there will be associated public concerns. The EUB places a high priority on addressing these concerns.

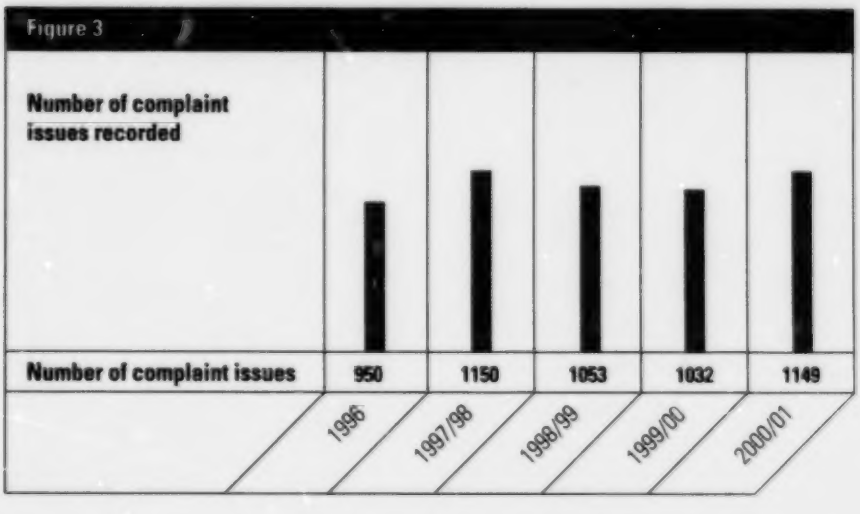
Figure 2



Field Surveillance staff respond to all complaints. The aim is to ensure prompt, effective, and lasting resolution of any problem identified. However, the EUB can only respond to issues within its jurisdiction; therefore, when it receives a complaint that is beyond the EUB's jurisdiction, the complainant is directed to the appropriate government agency.

During 2000/2001 the EUB received and responded to 924 complaints, compared to 859 in the previous year. Since a number of complainants reported concerns about more than one issue, the EUB recorded 1149 issues associated with the 924 complaints, as compared to the 1032 issues identified last year (see Figure 3).

Figure 3



- The EUB will continue to emphasize to industry the benefits and importance to industry of good communication with the public. The goal is to reduce the number of complaints and ensure lasting compliance.

- The increased staff for Field Surveillance will assist in the handling of complaints. By being proactive in the areas of facilitation and involvement with synergy groups, the EUB expects the number of complaints to decrease over time.

1.5.2 Complaint Follow-up

Field Surveillance has a random complaint call-back program to gauge the complainant's level of satisfaction with both EUB and industry responses. This information is analyzed to identify if changes are required to complaint response procedures by either the EUB or industry.

Results of the Complaint Call Back Survey indicate that in 2000/2001

- 65 per cent of incidents were resolved to the satisfaction of the complainants, compared to 81 per cent in 1999/2000;

- 66 per cent of the complainants were satisfied with the company response, compared to 89 per cent in 1999/2000; and

- 87 per cent of the complainants were satisfied with the response from the EUB, compared to 99 per cent in 1999/2000.

EUB Action

- The EUB is concerned with the reduction in the complainants' overall level of satisfaction with both industry and the EUB. Field Surveillance is investigating a number of ways to improve customer satisfaction.

- The EUB will target 60 per cent of complainants for follow-up to ensure that customer satisfaction improves in 2001/2002.

1.5.3 Types of Public Complaints

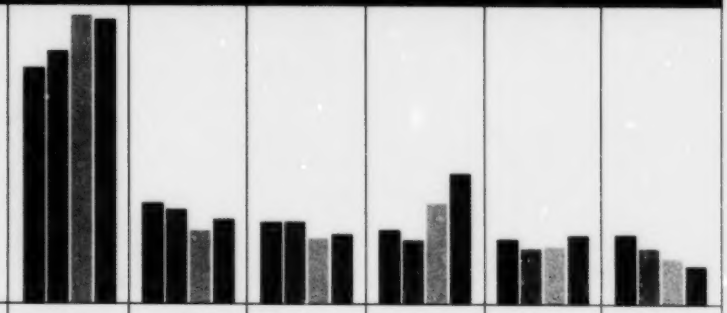
The EUB receives complaints on a variety of issues. Historically, the most common issues have been related to odours, flaring, lease management, public health, and safety (see Figure 4).

With the increase in activity in the oil and gas industry, the number of complaints received by the EUB also rose. Complaints related to odours and spills decreased by 2 per cent and 15 per cent respectively. However, there was an increase in the number of complaints related to flaring (23 per cent), noise (15 per cent), and public health and safety (5 per cent).

The increase in flare/smoke complaints is, in part, a result of the release of EUB *Guide 60: Upstream Petroleum Industry Flaring Guide*. Growing public concern about health and the environment has contributed to the increased number of complaints.

Figure 4

Distribution of complaints by issue



	Odours	Lease management	Public health and safety	Flare/smoke	Noise	Spills
1997/98	**336**	**143**	**116**	**105**	**92**	**99**
1998/99	360	134	117	91	79	80
1999/00	412	105	94	144	83	66
2000/01	**405**	**120**	**99**	**186**	**98**	55

The EUB, in conjunction with industry and the Clean Air Strategic Alliance (CASA), has undertaken several initiatives to reduce the volume of gas flared and improve flare efficiency. These initiatives include an increased emphasis on gas conservation programs, reduction in the duration of well tests, and advancements, such as using waste gas for electrical power generation. These initiatives should result in a reduction of complaints related to flaring.

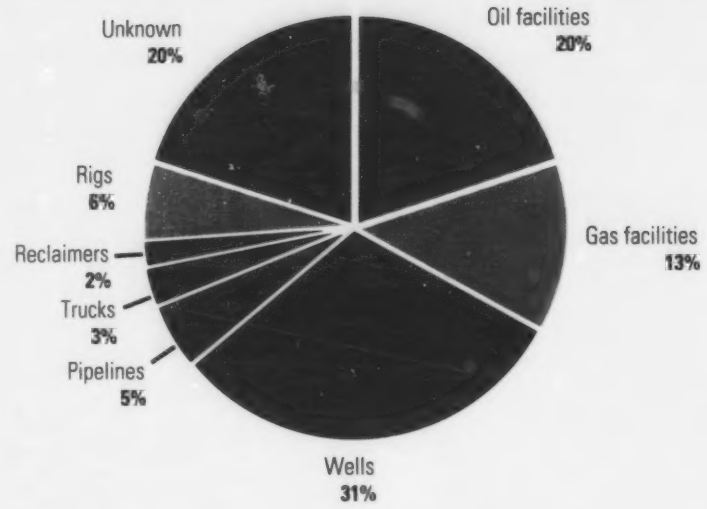
When the processes and procedures are in place to address the recommendations from the Advisory Committee on Public Safety and Sour Gas (see Section 1.7.1), the EUB expects that a reduction in complaints will occur.

Analysis of the odour complaints revealed that emissions occurred from a wide range of sources (see Figure 5). Wells, oil and gas facilities, and unknown sources were the largest sources of odours, at 84 per cent. Equipment failures, such as tank hatch leaks and ineffective vapour gathering systems, were identified as the most common causes of fugitive emission problems.

EUB Action

- The reduction in odour complaints is an improvement; however, the EUB views fugitive odours as unacceptable. The EUB expects operators to continually monitor their operations, improve equipment as new technology becomes available, properly maintain equipment, and focus on operational practices in an effort to eliminate fugitive emissions. EUB efforts will focus on increased inspections, more education and awareness, and, when necessary, applying escalating consequences when an operator fails to address operational problems or respond to public complaints.

Figure 5 Odour complaints by source, 2000/2001



- EUB staff will communicate to industry the most common problems found related to complaints (equipment failure, operational practices, etc.) and the need to ensure that appropriate remedial measures are taken.

1.6 Stakeholder Involvement Activities

1.6.1 Facilitation Efforts

It is industry's responsibility to discuss proposed development projects with the affected public and identify and address concerns, with limited EUB staff involvement. When issues or concerns arise that have not been resolved satisfactorily, EUB field staff are available to assist in bringing the parties together to

- discuss concerns regarding the proposed development,
- assist the public in understanding what the EUB requirements of industry are,
- facilitate the discussion of possible solutions,
- assist in understanding what issues and areas are within the EUB mandate, and
- ensure understanding of the EUB's Appropriate Dispute Resolution (ADR) process and hearing process, which are available to both parties.

In 2000/2001, EUB field staff spent 289 days on facilitation efforts. Field Surveillance staff were involved with 177 facilitations, of which 105 saw successful resolution and 8 went or are in the process of going to a hearing. This compares to 46 successfully resolved facilitations in 1999/2000. Facilitation efforts and third-party mediation continue on the remaining.

EUB Action

- Significant training has taken place for EUB field staff in 2000/2001. This training, which is continuing into 2001/2002 for both existing and new staff, will improve staff effectiveness in the facilitation area and staff understanding of ADR.

- Numerous presentations, meetings, and workshops have taken place to improve stakeholder understanding of ADR. ADR has proven effective in assisting industry and the public in resolving issues. Results to date include 19 third-party mediations, with 5 conflicts being successfully resolved. The ADR process was not successful in 2 of the 8 conflicts that went to hearing. ADR was not used in the other 6 cases that went to hearing. Mediation is ongoing for the remaining 12. The EUB will continue to take steps to improve stakeholder understanding of ADR. Detailed analysis of the results of third-party mediation efforts will occur in 2001/2002.

- ADR is an option available to stakeholders for both application and operational disputes. EUB staff are available to participate in this process when requested.

1.6.2 Synergy Groups

Synergy groups have proven to be another effective way to deal with issues and concerns. Synergy groups are usually made up of public, industry, and government representatives. The size, structure, and membership of the synergy group is dependent on factors such as population, production type, industry activity, geographical location, and sensitivity of an area. Currently EUB field staff participate in most of these groups and strongly endorse this cooperative approach to improve communication and address issues. Table 3 lists 66 active synergy groups located throughout the province.

EUB Action

- Synergy groups are very effective in improving communication and resolving issues. The EUB will continue to recommend, endorse, and participate with the synergy groups where appropriate.

1.6.3 EUB Open Houses

EUB open houses were held in Sherwood Park and Edson in 2000/2001, with 128 and 95 attendees respectively. The purpose of an open house is to

- communicate important EUB processes and policies,

- improve working relationships with stakeholders, and

- provide an opportunity for stakeholders to ask questions, express concerns, and solicit solutions to issues.

Open houses also offer attendees the opportunity to acquire information about the EUB and to discuss any issues they have with local field centre staff, EUB management, and Board Members. A variety of information is both on display and available to attendees. Open houses include presentations on key processes and policies, with a panel to hear and respond to issues and concerns. There is also time for one-on-one discussions.

Table 3. Active synergy groups in Alberta

Red Deer Field Centre
- Bashaw Community Advisory Group
- Butte Advisory Committee
- Caroline BHL "B" Pool Advisory Committee
- Eagle Valley Community Advisory Group
- Harmattan Elkton Community Advisory Committee
- Olds Community Advisory Group
- Parkland Airshed Management Zone (PAMZ)
- Sundre Petroleum Operator's Group (SPOG)
- Strachan Mutual Aid Group
- Sunchild/Ochiese Mutual Aid Group

Medicine Hat Field Centre
- Grassland Naturalists
- Shallow Gas Management Association
- Urban Environment and Recreation Advisory Board

Midnapore Field Centre
- Airdrie Public Petroleum Producers Awareness Alliance (APA)
- Cochrane Pipeline Operators Committee
- Drumheller Oil & Gas Operators Committee
- Okotoks (Nexen) Plant Site Reclamation Committee
- Quirk Creek Gas Processing Community Committee
- SE Calgary Community/Industry Association
- Shell Waterton Environment Round Table
- Williams Energy-Public Noise Group

Wainwright Field Centre
- Alliance/Brownfield Operators
- Chauvin Area Operators
- Consort Advisory Committee
- Hardisty Pipeline Terminal Committee
- Lloydminster Area Gas Conservation Committee
- Lloydminster Area Operators Gas Migration Team (LAOGMT)
- Provost Area Operators
- SaskAlta Oil Sands Producers

Drayton Valley Field Centre
- Edson Synergy Group
- Pembina Area Natural Resources Advisory Committee (PANRAC)
- Rider Pembina Advisory Committee
- West Central Air Shed Society

Bonnyville Field Centre
- Alberta Utility Location and Coordination Council
- Athasbasca Tribal Council (ATC)
- Beartrap Lake Society
- Clearwater Heritage River Committee
- Conklin Advisory Committee
- Cumulative Effects Monitoring Association (CEMA)
- Elk Point Surface Rights Assocation
- Heavy Crude Council
- Lakeland Industry & Community Association (LICA)
- Marie Lake Landowners Association
- Oilfield Traffic Committee
- Regional Sustainable Development Strategy (RSDS)
- Sask-Alta Waste Disposal Coop (SAWDC)
- STOP and Tell Our Politicians (STOP)
- Wood Buffalo Environmental Association

Grande Prairie Field Centre
- Clear Hills Surface Rights Association
- County Industrial Operators Group
- Fourth Creek Group
- Hay / Zama Committee
- Peace Air Shed Zone
- Peace River Arch Operators Group
- Rainbow Lake Operators
- Saddle Hills Awareness Group
- SPCA Beaverlodge Crime Prevention
- Valleyview Operators Group

St. Albert Field Centre
- AENV Carson Pegasus Provincial Park
- Bruderheim Operators Group
- East Parkland Liaison Committee (EPLC)
- Edmonton Area Pipeline Utilities Operators Committee (EAPUOC)
- Fort Air Partnership
- Rimbey and Area Multi Stakeholders Group
- Watelet Community Group
- West Edmonton Operators Group

A number of improvements have been made as a result of issues raised at previous open houses:

- In response to concern about the quality of information being provided related to development of projects on private land, significant changes were made to the public consultation process; as a result industry now provides more detailed information to landowners and residents.

- In response to concern about the operation of a gas plant, the public, industry, and government representatives formed a synergy group to collectively address issues and concerns and identify ways to improve communication.

The EUB will continue to host open houses as long as there is a need. Feedback to date indicates that attendees find them worthwhile and effective.

EUB Action

- In 2001/2002, open houses are scheduled for High Level (April), Calgary (June), and Rocky Mountain House (fall). The EUB will continue to measure the effectiveness of these open houses and make improvements as necessary.

1.7 Major Initiatives

1.7.1 Advisory Committee on Public Safety and Sour Gas

In January 2000, the EUB established the Advisory Committee on Public Safety and Sour Gas. The 22-member multistakeholder committee was asked to review the regulatory system for sour gas as it relates to public health and safety.

More than 1600 Albertans residing in major sour gas development areas in the province were consulted through public outreach sessions, written submissions, and telephone surveys to listen first hand to their issues. The committee analyzed the input it received and in October 2000 conducted a second round of public consultation to obtain feedback on its findings, analyze the feedback, and develop general recommendations.

The final report contains 87 specific recommendations directed toward

- improving understanding of sour gas,
- improving regulatory processes under which sour gas development is approved and operates,
- reducing impacts of sour gas on public health and safety, and
- improving consultation with the public on all sour gas matters.

An implementation plan for the first year of a multiyear project was developed and sets out the plan for proposed actions and schedules that will guide the work on 50 of the 87 recommendations from April 1, 2001, to March 31, 2002. Implementation of some of the recommendations will be completed within this period, but others will continue into the second and third years of the plan. For many of the recommendations, additional ongoing work will continue into the future as a result of changes to processes. Implementation plans for the remaining 37 recommendations will be developed in years two and three.

EUB Action

- The EUB is committed to ensuring that the recommendations of the Advisory Committee on Public Safety and Sour Gas are implemented. Several of the recommendations relate to Field Surveillance work. Resources are being dedicated in 2001/2002 and beyond to the implementation of processes and procedures to address the recommendations.

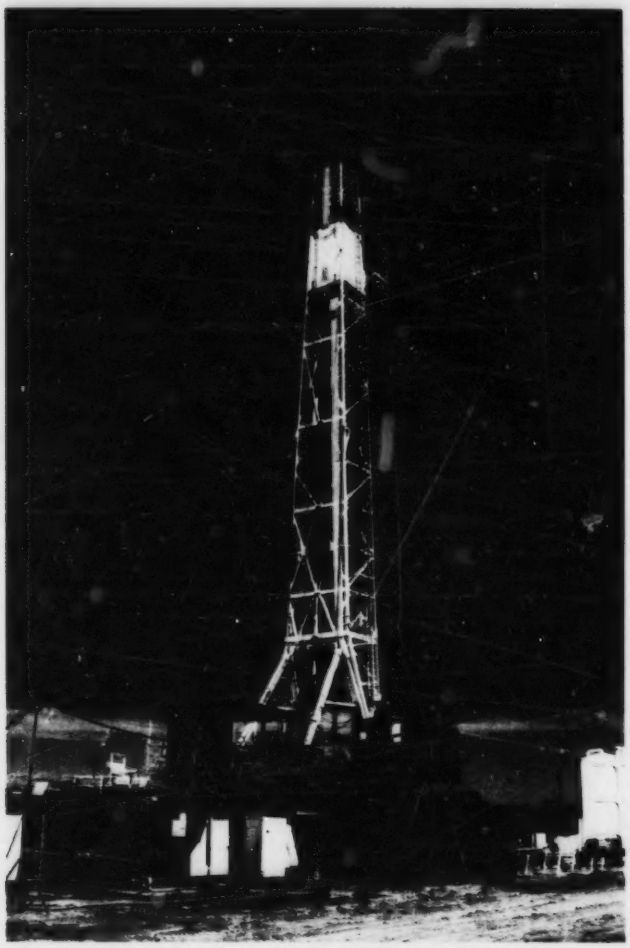
1.7.2 Orphan Program

A major issue facing Alberta is the proper abandonment and reclamation of wells, pipelines, and upstream oil and gas facilities if no financially viable owner exists. These wells, pipelines, and facilities are referred to as "orphans."

In 1994, Bill 5 established the Orphan Well Program, which saw the petroleum industry pay for the abandonment of orphan wells through an annual levy. In 2000, the Energy Statutes Amendment Act expanded the program to include pipelines, upstream oil and gas facilities, and the surface reclamation of well sites, pipeline rights-of-way, and facility leases. The new, expanded program is known as the Orphan Program. The program will be fully funded by the oil and gas industry through an expanded levy on inactive wells and facilities.

EUB Action

- The EUB is currently obtaining input on how the levy will be administered beginning in 2002.



Tarragon drilling rig near Rocky Mountain House

2 Drilling and Servicing

2.1 Introduction

The EUB is responsible for the regulation of drilling and servicing operations to ensure public safety, conservation of resources, and environmental protection. This is accomplished through existing regulations and requirements by conducting compliance inspections, monitoring operator and contractor performance, evaluating incidents, and applying fair and firm enforcement action in cases of noncompliance.

2.2 Well Control Occurrences

The EUB collects key well control occurrence data. This information assists the EUB in monitoring industry performance and identifies when changes to regulations, inspection procedures, or operating practices may be required.

One of the primary indicators of industry's drilling and servicing performance is the number of blows, blowouts, and kicks and industry's response to these incidents.

2.2.1 Drilling—Blows/Blowouts/Kicks

During the drilling of 14 621 wells in 2000/2001, four blowouts[5] and six blows[6] occurred (see Table 4). Two of the blowouts were freshwater flows that occurred while drilling surface hole (this is the first stage of drilling where no surface pipe or blowout preventers are in place). The remaining two blowouts resulted in sweet gas releases. One of these blowouts resulted in considerable equipment loss, with several workers incurring minor injuries.

Table 4. Drilling and servicing well control occurrences, 2000/2001

	Drilling	Servicing
Blowouts	4	4
Blows	6	1
Kicks	162	N/A

All of the six blows were sweet gas releases and were of short duration.

In 2000/2001 there were 162 kicks[7] recorded during the drilling of 14 621 wells. This equates to a kick occurrence rate of approximately 11 kicks per 1000 wells drilled. The kick occurrence rate has remained relatively constant for the last four years and is a significant improvement from the years prior to 1997/1998, when the kick occurrence rate averaged 23 kicks per 1000 wells drilled.

2.2.2 Servicing—Blows/Blowouts

In well servicing operations a total of four blowouts and one blow occurred in 2000/2001 (see Table 4). All blows and blowouts were sweet gas releases. One of the blowouts resulted in injuries and considerable equipment loss. All blowouts were successfully brought under control.

EUB Action

- A blow/blowout review team was established in 2000/2001 to review all blows and blowouts related to drilling and servicing operations. The EUB team will identify measures that can be taken to reduce future drilling and servicing blows and blowouts.

- The EUB expects industry to maintain its high training standards for rig personnel in well control and crew training. These continue to be high-priority inspection areas for EUB staff.

[5] The complete loss of control of the flow of fluids (gas, oil, water, mud) from a well. Control can only be regained by installing or replacing equipment to permit shut-in or killing the well or by drilling a relief well.

[6] The unexpected release of wellbore fluids (gas, oil, water, mud) to the atmosphere. The flow can be controlled almost immediately by shutting the well in using wellhead valves or blowout prevention equipment or by directing the flow to the flare system until the well is killed.

[7] During drilling operations, any unexpected entry of water, gas, oil, or other formation fluid into a wellbore that is under control and can be circulated out.

2.3 Drilling—Inventory, Activity Levels, and Inspections

The 14 621 new wells drilled during 2000/2001 was a record for wells drilled in the province of Alberta. This was a 27 per cent increase over the 11 548 wells drilled in 1999/2000 and more than double the wells drilled in 1998/1999 (see Table 5).

Table 5. Alberta drilling activity and EUB inspection results

	1996	1997	1998/99	1999/00	2000/01
Wells drilled	10 773	13 075	7 094	11 548	14 621
Drilling rigs inspected	458	421	696	631	648
% inspected	4.2	3.2	9.8	5.5	4.4
% satisfactory	88.0	79.0	85.0	87.1	87.7
% unsatisfactory (total major and minor)	12.0	21.0	15.0	12.9	12.3

The number of new wells drilled brings the total number of nonabandoned wells in Alberta to over 147 890.

2.4 Drilling—Inspections

During 2000/2001, EUB field staff conducted 648 inspections on drilling operations, resulting in 568 satisfactory inspections (87.7 per cent) and 80 unsatisfactory inspections (12.3 per cent). This compares to 631 inspections in 1999/2000, of which 549 were satisfactory inspections (87.1 per cent) and 82 were unsatisfactory inspections (12.9 per cent) (see Table 5).

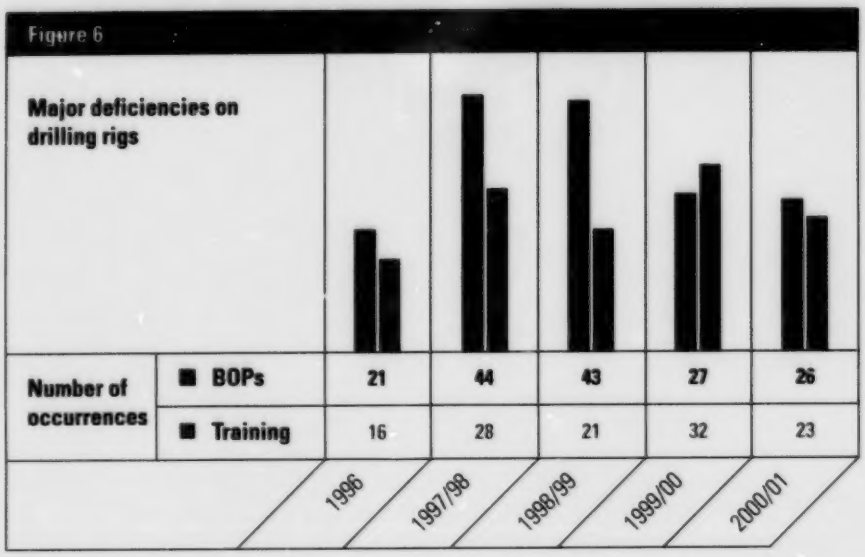
EUB Action

- The EUB prioritizes all drilling rig inspections. The criteria for conducting priority inspections are based on a point system that includes operator/contractor performance, site sensitivity, and inherent risk (OSI). The EUB will continue to use a priority inspection system that targets noncompliant operators and high-risk operations (sour wells).
- EUB field staff will continue to hold meetings or make presentations to operators and drilling contractors to ensure that EUB regulations and requirements are understood.
- EUB field staff will continue to apply consistent enforcement action for noncompliance to increase industry awareness of and accountability for EUB requirements.

2.4.1 Drilling—Major/Serious Unsatisfactory Items

Of the 648 drilling inspections conducted in 2000/2001, 41 major unsatisfactory inspections resulted, with a total of 49 major unsatisfactory items being recorded (see Section 1.3 for definitions of satisfactory inspection and minor, major, and serious unsatisfactory inspections). Operational failures of the BOP/accumulator systems resulted in 26 of the unsatisfactory items, while deficiencies in crew training accounted for the remaining 23 (see Figure 6). This was an improvement over 1999/2000, when 27 failures of the BOP/accumulator systems and 32 deficiencies in crew training were noted. There were no serious unsatisfactory inspections recorded in 2000/2001.

Figure 6



Drilling operations were suspended at all rigs with major unsatisfactory items until the deficiencies were corrected. This resulted in 41 shutdowns, totalling about 145 hours, compared to 1999/2000 when 50 rig shutdowns totalled 81 hours.

EUB Action

- The EUB will continue to take enforcement action for all unsatisfactory inspections, including suspending operations with major or serious unsatisfactory items.

2.5 Servicing—Activity Level

2000/2001 was a record year for well servicing activity in the province of Alberta. This was in part due to the record number of new wells drilled during the year.

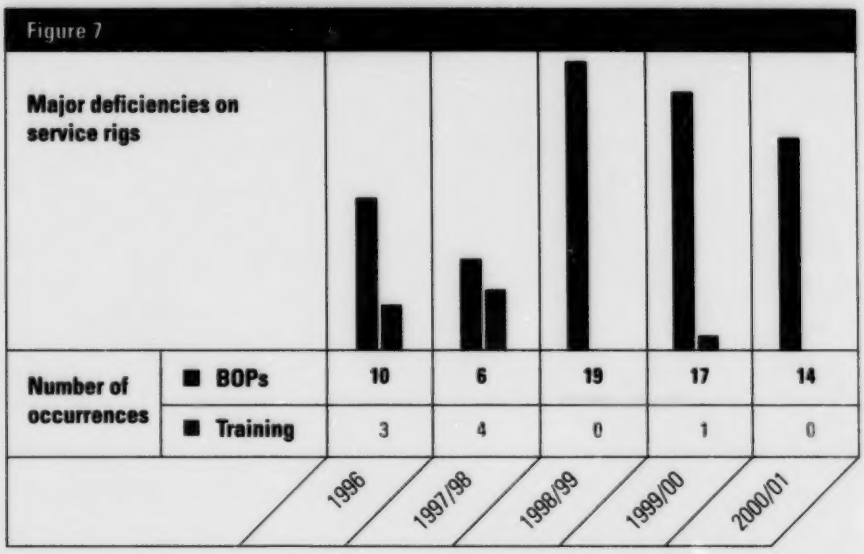
2.5.1 Servicing—Inspections

In 2000/2001 EUB field staff conducted 348 inspections on well servicing operations, resulting in 303 satisfactory inspections (87.1 per cent) and 45 unsatisfactory inspections (12.9 per cent). This compares to 350 inspections in 1999/2000, which resulted in 314 satisfactory inspections (89.7 per cent) and 36 unsatisfactory inspections (10.3 per cent).

2.5.2 Servicing—Major/Serious Unsatisfactory Items

Of the 45 unsatisfactory inspections recorded in 2000/2001, 14 were major unsatisfactory inspections, with a total of 14 major unsatisfactory items noted. This compares to 13 major unsatisfactory inspections, with a total of 18 major deficiencies, noted in 1999/2000. Operational failures of the BOP/accumulator systems accounted for all of the major deficiencies recorded in 2000/2001 (see Figure 7). This was an improvement over 1999/2000, when there were 17 operational failures of the BOP/accumulator systems and one deficiency noted under crew training. There were no serious unsatisfactory inspections recorded in 2000/2001.

Figure 7



Servicing operations were suspended at all rigs with major unsatisfactory items until they were corrected. This resulted in 14 shutdowns, totalling about 31 hours, compared to 1999/2000, when 13 rig shutdowns totalled 20 hours.

EUB Action

- EUB field staff will continue to hold meetings or make presentations to operators and well servicing contractors to ensure that EUB regulations and requirements are understood.

- The EUB will continue to take enforcement action for all unsatisfactory inspections, including suspending operations with major or serious unsatisfactory items.

2.6 Inspection Manual Reviews—Drilling and Servicing

In 2000 the EUB undertook to review and rewrite both *Guide 36: Drilling Rig Inspection Manual* and *Guide 37: Service Rig Inspection Manual*. The primary focus was to clarify sections of the manuals and make them more user friendly. The drafts of both manuals will be available in the fall of 2001 for stakeholders to review.

Six directionally drilled oil-producing wells west of Edmonton

3 Oil Production Facilities

3.1 Introduction

EUB staff spend considerable time with companies conducting operator awareness sessions to increase their understanding of EUB requirements and the consequences for noncompliance. These operator awareness sessions may include a review of EUB *Guide 64: Facilities Inspection Manual*, EUB *Guide 60: Upstream Petroleum Industry Flaring Guide*, and EUB *Informational Letter (IL) 99-4: EUB Enforcement Process, Generic Enforcement Ladder, and Field Surveillance Enforcement Ladder*.

EUB field staff also focus on companies with high minor unsatisfactory inspection rates, with the goal of improving their compliance record.

Significant resources are used to deal with public complaints associated with oil production facilities. Field staff work with industry to ensure that proper equipment is in place and regular maintenance occurs to minimize facility upsets that result in impacts on the public.

3.2 Reduction in Potential Public Liabilities from Suspended and Derelict Facilities

In previous years EUB field staff focused their efforts on suspended facilities that had not produced for two or more years. Companies were requested to initiate reclamation if facilities were deemed uneconomic.

As part of the expanded orphan program, the EUB requires virtually all upstream oil and gas facilities to be licensed. A retrospective facility licensing program was initiated to obtain an inventory of facility owners and working interest participants. The EUB, in collaboration with the oil and gas industry, is developing screening criteria to assess the liability of individual licensees for well and facility abandonment and reclamation activities. When implemented, licensees that fail the assessment will be required to submit a security deposit to the EUB.

With the introduction of the EUB Liability Management Program (LMP), fewer resources will be dedicated to inspect suspended facilities in 2001/2002.

EUB Action

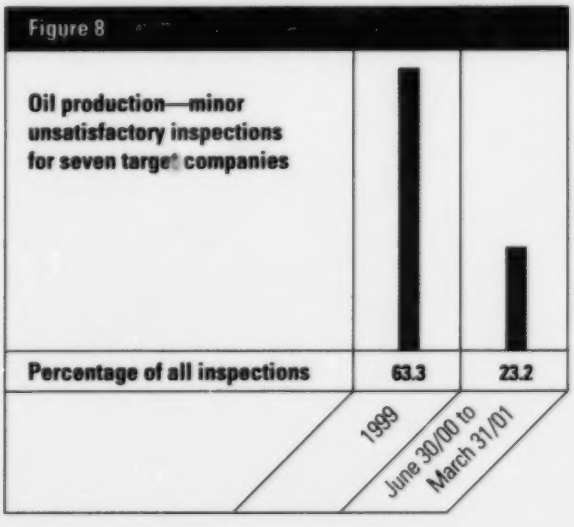
- The EUB will continue to work with the oil and gas industry to develop appropriate screening criteria and security deposit processes for implementation in 2001/2002. The security deposits will be used to address a licensee's abandonment and reclamation activities if the licensee is unable or unwilling to fulfill these obligations.

3.3 Companies with High Minor Unsatisfactory Inspection Rates

The process to identify companies with a minor unsatisfactory inspection rate that is significantly above the industry average is outlined in EUB *IL 99-4*. Based on the 1999 inspection record, the EUB targeted companies (total of seven) that had a minor unsatisfactory rate greater than 50 per cent. The EUB held meetings with each company to review its 1999 inspection record. Each company was required to develop an action plan to address minor unsatisfactory conditions at its production facilities. The EUB outlined the escalating consequences that would apply if its inspection record did not show significant improvement upon review in April 2001.

In 1999 these seven companies together had 147 initial inspections. Minor unsatisfactory conditions were found at 93 batteries, resulting in a 63.3 per cent unsatisfactory rate. The EUB inspection record review of these seven companies from June 30, 2000, to March 31, 2001, indicated that of the total 177 initial inspections, minor unsatisfactory conditions were found at 41 batteries, resulting in a 23.2 per cent unsatisfactory rate (see Figure 8). This is a significant improvement in their EUB compliance rate, and continuous improvement is expected as a result of the measures implemented by the companies.

Figure 8



Measures taken by these companies to improve their compliance rate include

- conducting independent third-party inspections at their batteries;

- inspecting each of their batteries using EUB *Guide 45: Battery Inspection Manual* as a reference;
- holding meetings with trucking firms to inform them of the necessity of maintaining a clean operation;
- holding meetings with company personnel and contract operators to ensure that they are aware of EUB requirements; and
- including the company's EUB inspection history in the criteria for setting employee bonuses.

EUB Action

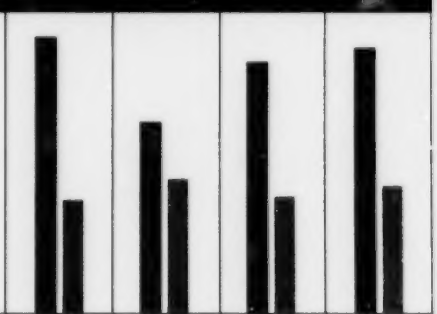
- The EUB will focus on companies that clearly exceed the minor unsatisfactory industry average. Companies will be required to submit a written action plan to address noncompliant items at similar facilities they operate provincially. If future EUB inspections indicate that they continue to exceed the minor unsatisfactory industry average, consequences may be elevated to third-party inspections at the company's expense and/or full or partial suspensions, as directed by the EUB.

3.4 Public Complaints

During 2000/2001, EUB field centres investigated 111 public complaints related to odours and smoke/flaring at oil production facilities, compared to 104 similar complaints in 1999/2000 (see Figure 9).

Figure 9

Oil production—odour and smoke/flaring complaints



	1997/98	1998/99	1999/00	2000/01
■ Odours	78	54	71	75
■ Smoke/flaring	32	38	33	36

Each year the EUB reviews the public complaint history of each oil production facility to determine if there were repeat complaints. If so, EUB field staff determine whether additional regulatory or industry action is required to effectively achieve lasting improvement.

In the 2000/2001 reporting year, 19 oil facilities were identified with repeat public complaints, which were related to odours, smoke/flaring, noise, spills, and lease management, compared to 12 oil facilities with repeat complaints in 1999/2000.

EUB Action

- The EUB will ensure that operators investigate sources of emissions, install new equipment, utilize modern technology to reduce emissions, continuously monitor operations, and improve communications with area residents.

3.5 Inventory, Activity Level, and Inspections

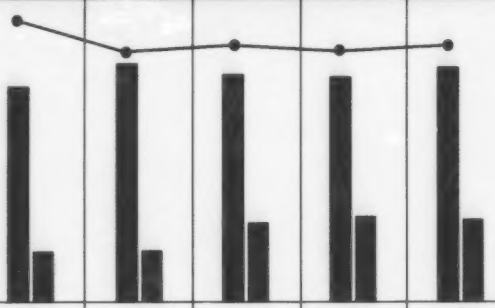
The current inventory of conventional oil and crude bitumen batteries/satellites has increased from previous years and is as follows:

- sweet multiwell 1547
- sour multiwell 649
- sweet single well 8200
- sour single well 1235
- sweet satellites 2315
- sour satellites 1315

Figure 10 shows the inventory of oil batteries and associated satellites, the number of battery/satellite inspections, and the percentage found to be satisfactory for the years 1996/97 to 2000/2001 (see Section 1.3 for definitions of satisfactory inspection and minor, major, and serious unsatisfactory inspections). Of the battery and satellite inspections conducted in 2000/2001, there was a 71 per cent satisfactory inspection rate. This rate has remained relatively constant over the past five years.

Figure 10

Oil production—inventory, battery/satellite inspections, and percentage satisfactory



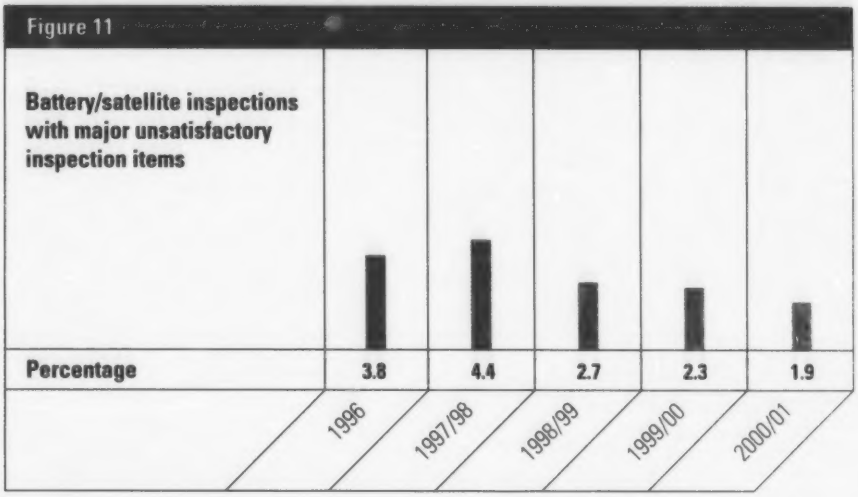
	1996	1997/98	1998/99	1999/00	2000/01
Percentage satisfactory	73.7	70.3	71.0	70.4	70.7
Inventory	14000	15500	14787	14634	15261
Battery/satellite inspections	3271	3347	5155	5590	5393

Using the OSI[8] priority inspection process, EUB staff conducted 5393 battery and satellite inspections in 2000/2001. This inspection level is comparable to the previous year, when 5590 inspections were conducted.

Major unsatisfactory conditions were found in 103 of 5393 inspections (1.9 per cent) in 2000/2001. There were no serious unsatisfactory inspections recorded. Thirty-four oil production facilities were suspended as a result of major unsatisfactory inspections. Appropriate enforcement action was taken on the remaining to bring the facilities into compliance. This compares with 127 major unsatisfactory conditions identified in 5590 inspections (2.3 per cent) in 1999/2000.

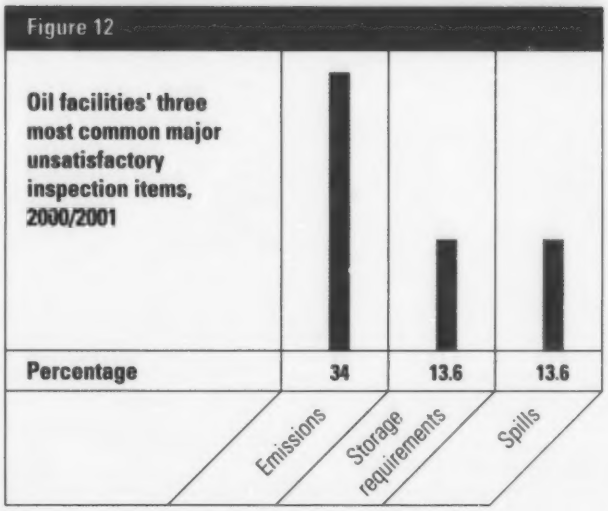
Figure 11 shows the percentage of battery/satellite inspections with major unsatisfactory inspections since 1996.

Figure 11



The three most common major unsatisfactory inspection items found in 2000/2001 are shown in Figure 12. The most common major unsatisfactory inspection items are

Figure 12



[8] As stated in Section 1.3, the EUB does inspections based on priority selection criteria that include **operator**/contractor performance history, site **sensitivity**, and **inherent** risk of the operation (OSI).

- thief hatch failure from production tanks resulting in hydrogen sulphide emissions off lease;

- no dike installed around the production tanks, resulting in inadequate secondary containment; and

- operator not applying the appropriate resources to address spills.

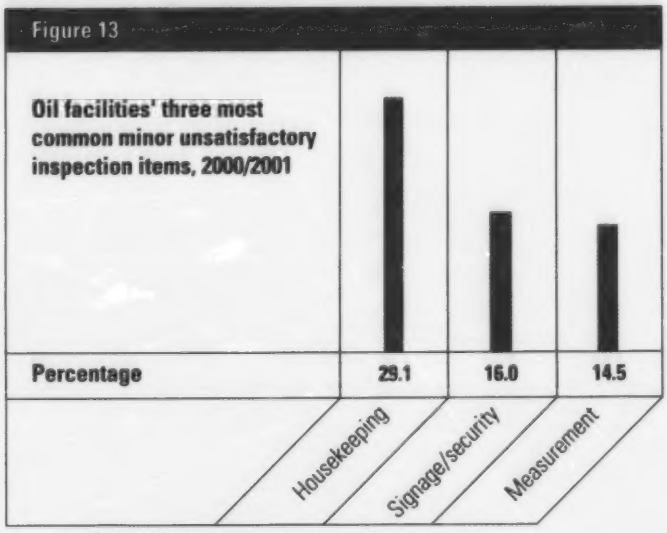
EUB Action

- Major unsatisfactory inspections will be dealt with as outlined in *IL 99-4*. Consequences include suspension of operations if necessary to alleviate impact; company instructed to take corrective action at subject site and ensure compliance at all similar facilities that it operates provincially; documented action plan required to ensure that the issue or event does not recur or is minimized.

- The EUB will meet with industry associations to discuss inspection results, focusing on identifying the most common unsatisfactory items and finding solutions to improve industry compliance.

Minor unsatisfactory conditions were found in 1477 of the 5393 inspections (27.4 per cent) in 2000/2001. All unsatisfactory conditions were addressed by industry. This compares with 1407 minor unsatisfactory conditions in 5590 inspections (25.2 per cent) in the previous year. The most common minor unsatisfactory items found in 2000/2001, shown in Figure 13, were

Figure 13



- housekeeping
  - garbage or loose debris not being stored in a reasonable manner
  - oil-stained areas on lease not cleaned up

- signage/security
  - no identification or warning signs posted
  - fencing not adequate where required

- measurement
  - meter calibration expired

EUB Action

- Minor unsatisfactory inspections will be dealt with as outlined in *IL 99-4*.

Producing sour gas well north of Edson

4 Gas Production

4.1 Introduction

In 1996 the EUB developed a provincial inspection program to integrate a general plant inspection with a more detailed assessment of environmental and public-related issues. This operational audit process reviews items such as emergency response preparedness, flare measurement and control, tank storage requirements, and waste management programs.

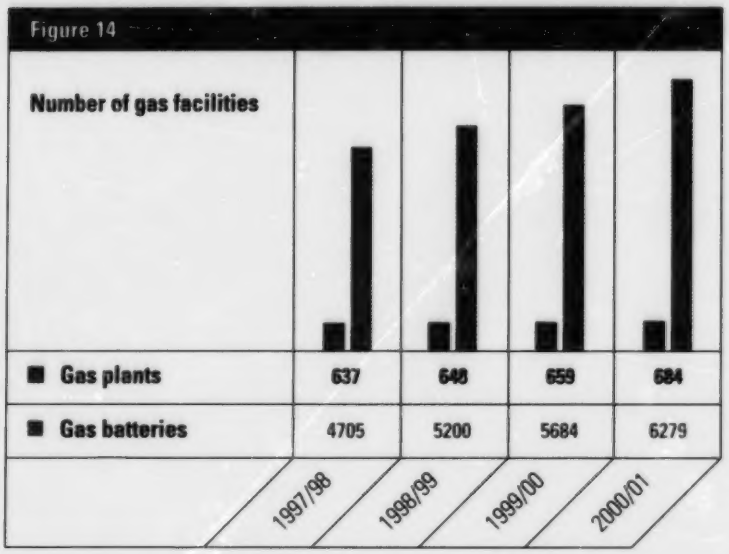
The EUB also initiated a gas plant surveillance program in 1998 to encourage industry to reduce flaring at gas processing facilities. As part of the process, companies with gas plants flaring more than 0.5 per cent of the total annual volume delivered to the plant were required to submit a plan outlining actions to reduce reported flare volumes.

In addition, EUB staff spent considerable time attempting to resolve public concerns related to proposed and existing gas production facilities. EUB field staff involvement in open houses, information sessions, industry and community meetings, and synergy groups helped alleviate public concerns and improve industry awareness of the impact their facilities have on surrounding residents.

4.2 Inventory, Activity Level, and Inspections

Continued record activity levels in the natural gas industry led to an increase of 7297 producing gas wells in 2000/2001, compared to 4794 new gas wells last year. At year end, there were 57 106 producing gas wells in Alberta. As a result, the number of single- and multiwell gas batteries increased significantly from the previous year (see Figure 14).

Figure 14



The number of gas plants has remained relatively constant, as shown in Figure 14. There are 442 sweet gas plants and 242 sour gas plants operating in the province, including 47 sulphur recovery facilities and 28 sour gas plants with acid gas injection schemes. The emergence of midstream[9] companies has led to the creation of a pipeline infrastructure connecting most of the larger processing facilities in western Alberta. A large portion of the new gas production in 2000/2001 was tied into this infrastructure, providing increased utilization of existing processing capacity and a reduction in new gas plant construction.

There were 968 initial inspections completed on gas production facilities in 2000/2001, representing a substantial increase in inspection levels from 1999/2000, when 627 inspections were conducted (see Figure 15). EUB field staff also conducted 72 inspections of well test flaring operations to ensure compliance with EUB *Guide 60: Upstream Petroleum Industry Flaring Guide*.

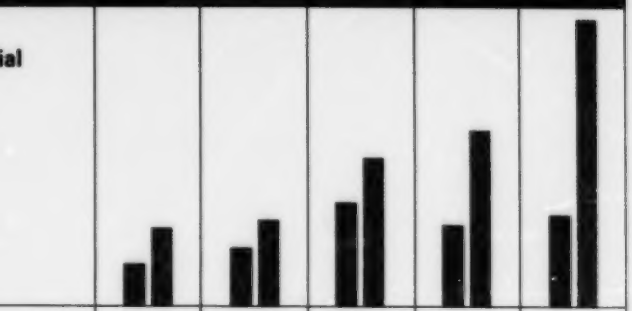
EUB Action

- The EUB will continue to maintain its gas facility inspection levels as necessary to achieve continued improvement in compliance levels.

[9] Midstream companies are those in the business of providing gathering and processing services to the upstream petroleum industry.

Figure 15

Gas production—initial inspections



	1996	1997/98	1998/99	1999/00	2000/01
■ Gas plants	107	148	264	207	233
■ Gas batteries	199	220	379	420	735

4.3 Compliance Levels

In 2000/2001 the satisfactory initial inspection rate for gas batteries remained comparable to 1999/2000 (see Section 1.3 for definitions of satisfactory inspection and minor, major, and serious unsatisfactory inspections). However, the satisfactory initial inspection rate for gas plants decreased from 64.7 per cent in 1999/2000 to 54.1 per cent in 2000/2001.The introduction of EUB *Guide 60: Upstream Petroleum Industry Flaring Guide* effective January 1, 2000, contributed to the decrease in compliance levels (see Figure 16). This decrease in compliance is typical when new requirements are introduced to industry. It is expected that once industry understands and becomes familiar with the new requirements, increased compliance will occur. The percentage of satisfactory follow-up inspections increased in 2000/2001 (see Figure 17), indicating industry's understanding of the EUB enforcement process based on escalating consequences.

Figure 16

Gas production—percentage of satisfactory initial inspections

	1996	1997/98	1998/99	1999/00	2000/01
■ Gas plants	62.2	60.8	64.4	64.7	54.1
■ Gas batteries	61.8	58.2	52.5	66.5	65.0

Figure 17

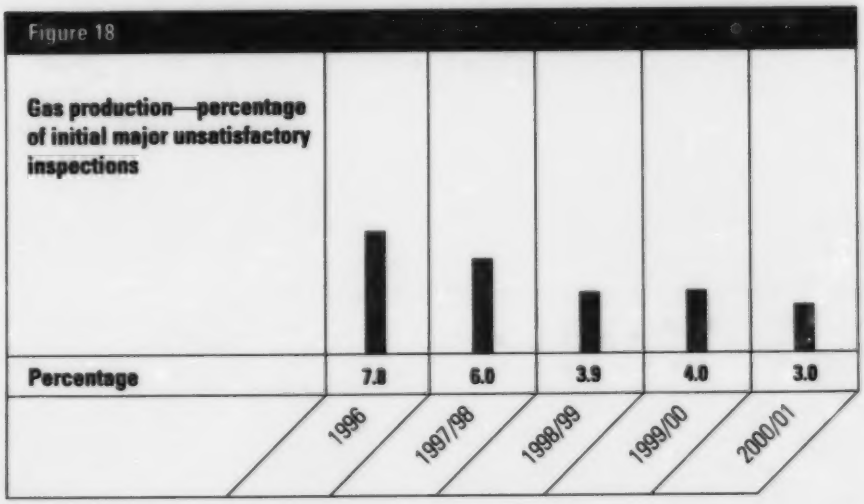
Gas production—satisfactory follow-up inspections

EUB staff completed 77 operational audits of sulphur recovery facilities, straddle plants, and acid gas flaring plants since 1996, including 12 audits in 2000/2001. Of the 77 operational audits completed, 42 had satisfactory inspections. In addition, there were 32 minor unsatisfactory inspections and 3 major unsatisfactory inspections. All facilities were brought into compliance.

Major unsatisfactory inspections accounted for 3 per cent of all gas facility inspections completed in 2000/2001 (see Figure 18), compared to 4 per cent major unsatisfactory inspections in 1999/2000. No serious unsatisfactory inspections were recorded in 2000/2001. Of all major unsatisfactory inspections, 86 per cent originated at single- and multiwell gas batteries (gas well installation and compressor stations). EUB field staff suspended seven facilities with major unsatisfactory inspections in 2000/2001 until improvements were made to ensure that the facilities operated with minimal impact.

Figure 18

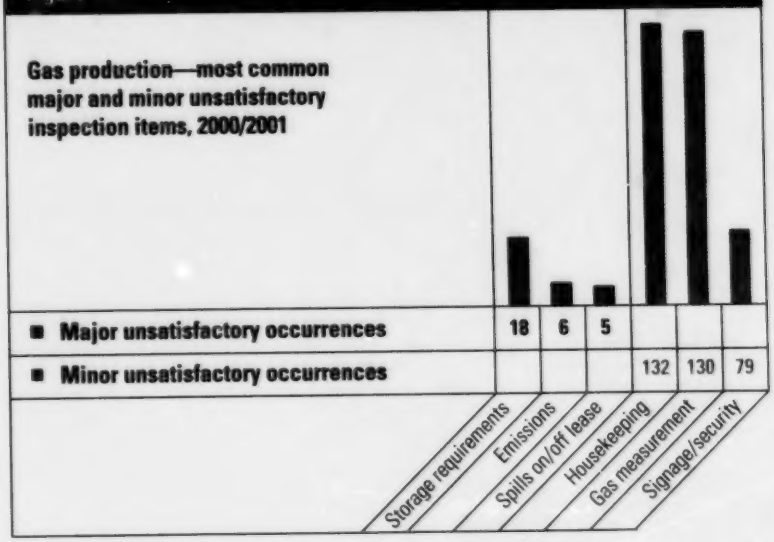
Gas production—percentage of initial major unsatisfactory inspections



Noncompliance with storage requirements (no tank dikes), unaddressed hydrocarbon spills, and off-lease sour gas emissions were the most common major deficiencies and accounted for 83 per cent of all major unsatisfactory inspections during 2000/2001 (see Figure 19). Poor housekeeping practices (hydrocarbon staining), gas measurement

Figure 19

Gas production—most common major and minor unsatisfactory inspection items, 2000/2001



problems and improper lease signage accounted for 58 per cent of all minor deficiencies recorded. Lack of public and/or EUB notifications were the most common problems associated with sweet and sour gas well test flaring operations.

EUB Action

- The EUB will continue to use a priority inspection selection process, focusing on companies with a noncompliant inspection history and facilities having the greatest potential to impact the public or the environment. Inspections are prioritized based on operator history, site sensitivity, and inherent risk.

- EUB field staff will maintain their focus on operator awareness and education programs. Presentations and information sessions improve industry's understanding of EUB requirements and enforcement policies.

- EUB field staff will continue to conduct gas plant operational audits, focusing primarily on environmental and public safety issues and verifying industry's understanding of and compliance with regulatory requirements and public expectations.

4.4 Gas Plant Flare Surveillance Program

In 2000/2001 the EUB requested 22 action plans from companies with gas processing facilities exceeding the 0.5 per cent yearly flaring allowable for 1999. Operational problems, production accounting errors, and faulty measurement were the most common reasons associated with companies reporting excessive gas plant flare volumes. A follow-up review of the year-2000 flaring reports of these 22 facilities indicated an overall flare volume reduction of 17 434.5 thousand cubic metres from the previous year.

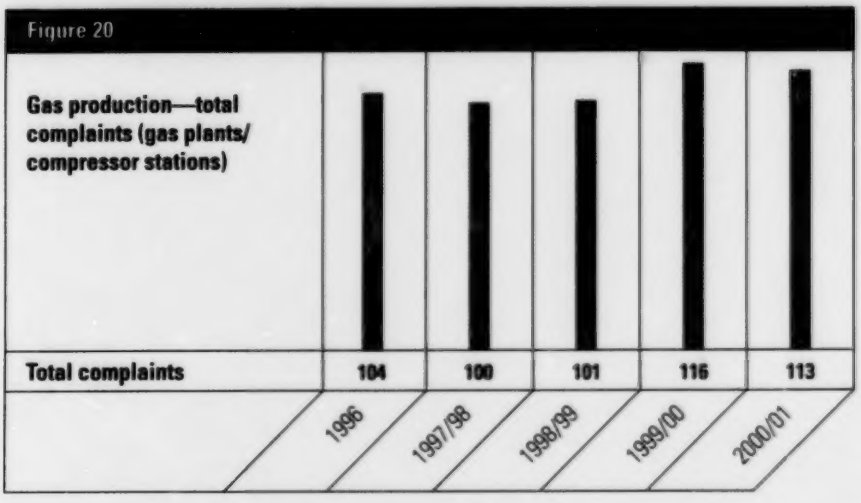
EUB Action

- The EUB believes this program was successful and will continue it in 2001/2002.

4.5 Public Complaints

The number of public complaints related to gas production facilities (gas plants and compressor stations) decreased slightly, from 116 in 1999/2000 to 113 in 2000/2001 (see Figure 20). An additional 142 complaints were directed at gas well installations. Of these, 30 per cent were attributed to flaring during well testing operations.

Figure 20



The impact gas production facilities have on the public continues to be a concern to the EUB. Fugitive emissions, noise from compressors, flaring, and black smoke are the primary issues affecting the public.

EUB Action

- Inspection audits of well test flaring operations will continue to be a priority. EUB field staff will focus on sweet and sour flaring operations in populated areas and those wells containing greater than 5 per cent hydrogen sulphide (H_2S).

- Public complaints directed at gas production facilities remains high. EUB field staff will work cooperatively with industry and the public to address these concerns and ensure lasting improvements at gas facilities.

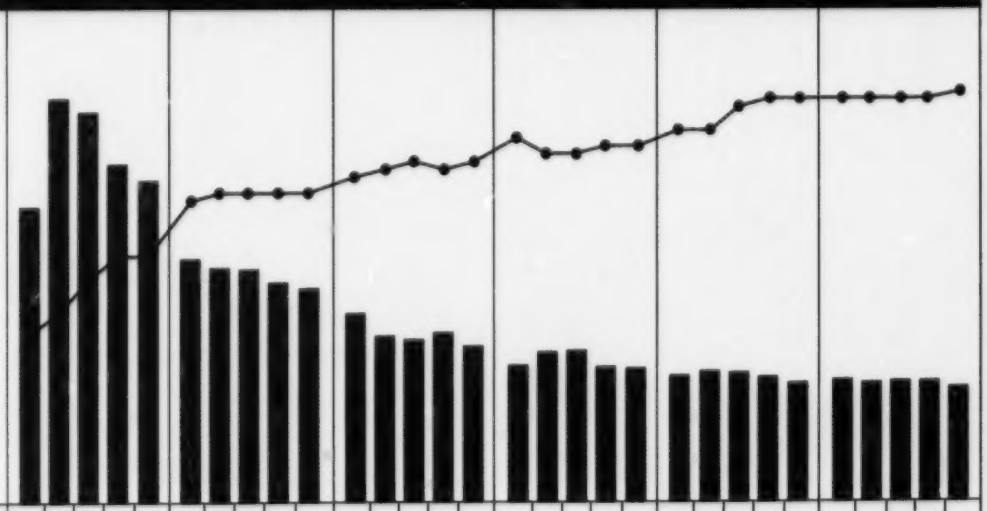
- The CASA Flaring/Venting Project Team was recently formed at the request of the EUB, industry, and environmental organizations. Its purpose is to assess performance and make recommendations regarding the solution gas flaring management framework, as well as addressing a broader range of flaring and venting issues in Alberta.

4.6 Sulphur Recovery

Sulphur recovery efficiencies at gas plants, recovering salable sulphur, increased from 98.7 per cent in 1999 to 98.8 per cent in 2000. Overall, sulphur emissions decreased by 4.9 per cent in 2000 (from 82 000 tonnes to 78 000 tonnes), primarily due to major improvements and modifications to four large sulphur recovery facilities operating in Alberta (see Figure 21).

Figure 21

Efficiency versus emissions of sulphur recovery plants



	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Sulphur emissions (thousand tonnes)	200	273	264	229	216	165	159	158	149	145	128	113	110	115	105	93	102	103	92	91	86	89	88	85	81	83	81	82	82	78
Recovery efficiency (percentage)	95.7	96.0	96.4	96.7	96.7	97.4	97.5	97.5	97.5	97.5	97.7	97.8	97.9	97.8	97.9	98.2	98.0	98.0	98.1	98.1	98.3	98.3	98.6	98.7	98.7	98.7	98.7	98.7	98.7	98.8
Year																														

The EUB, in conjunction with Alberta Environment, is currently reviewing the existing sulphur recovery guidelines (EUB *Informational Letter 88-13: Sulphur Recovery Guidelines—Gas Processing Operations*). The review will update and clarify the sulphur recovery requirements for grandfathered sour gas plants, as well as other types of sour gas facilities. This document is expected to be released in the near future.

Welded pipeline prior to the burial of the pipe, close to Wainwright

5 Pipeline

5.1 Introduction

Companies operating pipelines in Alberta are responsible for complying with all applicable standards and EUB regulations.

EUB field staff conduct inspections based on the following criteria:

- operator inspection history,
- site sensitivity, and
- inherent risk.

Inspection processes are in place to monitor compliance and apply enforcement measures for noncompliance (see Section 1.3 for definitions of satisfactory inspection and minor, major, and serious unsatisfactory inspections). During the past year, when major or serious unsatisfactory inspection items were found the pipeline was suspended until appropriate remedial action was taken (see Table 1).

The Field Surveillance Pipeline Team focuses its inspection activities on four key inspection areas:

1) **Pipeline failures/hits**—The Alberta Pipeline Act requires all licensees of pipelines to report any pipeline failures/hits to the EUB regardless of the cause, magnitude, or consequence. EUB field staff verify the cause of the failure/hit and ensure that mitigative measures are taken to reduce future failures/hits by the pipeline system.

2) **Construction and pressure testing**—EUB field staff conduct inspections on new pipeline installations to ensure compliance with the requirements.

3) **Operations inspections**—EUB field staff conduct inspections on existing pipeline systems to ensure that operators conduct the operation and maintenance of the pipeline in accordance with the requirements to ensure pipeline integrity (maintenance of valves, cathodic protection systems, corrosion monitoring and control systems, right-of-way and warning signs, emergency contact numbers, etc.).

4) **Contact damage**—EUB field staff inspect sites where pipeline contact damage has occurred. Awareness seminars are held for operators and contractors to educate them on requirements that must be met prior to commencing ground disturbance activities in order to reduce incidents of pipeline hits, enhance public safety, and reduce environmental impacts.

The length and types of licensed pipelines in Alberta under EUB jurisdiction are listed in Table 6.

Table 6. Length of licensed pipelines by type in Alberta under EUB jurisdiction (km)[1]

Year	Crude oil	Natural gas	Sour gas	Water	Multiphase	Others	Total
Up to 1988	10 940	83 916	4 707	10 874	25 926	13 249	149 612
1989	316	4 136	770	436	1 577	697	7 932
1990	180	5 172	423	575	1 141	938	8 429
1991	578	3 763	261	548	1 155	374	6 679
1992	538	3 549	185	475	1 159	381	6 287
1993	454	6 265	390	634	1 864	703	10 310
1994	141	3 831	185	464	1 210	232	6 063
1995	604	10 967	762	946	2 277	771	16 327
1996	418	7 683	1 188	655	1 979	900	12 823
1997	819	9 323	1 154	787	2 183	1 897	16 163
1998	1 146	12 933	2 392	982	2 757	1 401	21 611
1999	712	8 871	1 394	501	1 207	1 610	14 295
2000	222	12 290	1 388	498	1 601	1 269	17 268
TOTAL	17 068	172 699	15 199	18 375	46 036	24 422	293 799
Percentage of total length constructed, by category	5.8%	58.8%	5.2%	6.2%	15.7%	8.3%	100.0%

[1] Numbers were calculated by adding all statuses (operating, permitted, abandoned, discontinued, and suspended) for all types of pipelines.

5.2 Pipeline Failures/Hits

A pipeline failure is defined as the failure of the pipeline to contain the substance being transported. For statistical purposes, it is designated as a hit, leak, or rupture.

- A hit is defined as striking a buried pipeline during a ground disturbance activity resulting in the pipeline or pipeline coating being damaged. A release of product does not necessarily result.

- A leak is defined as an opening, crack, or hole in a pipeline causing some product to be released, but not immediately impairing the operation of the pipeline.

- A rupture is defined as the instantaneous tearing or fracturing of the pipeline material, immediately impairing the operation of the pipeline.

The EUB's release reporting and inspection priority system applies to all pipeline releases:

- Priority 1 releases pose the threat of serious environmental and public impacts and are inspected immediately. In most cases EUB field staff respond; however, in situations where it is virtually impossible for an EUB staff to inspect the site immediately, all attempts are made to have another regulatory agency respond. In such cases, the EUB will conduct an inspection as soon as it can. EUB staff inspect 100 per cent of priority 1 releases.

- Priority 2 releases are generally mid- to high-volume releases but may include low-volume releases if the operator is new or has a poor inspection history. These releases are generally inspected by EUB staff within 10 working days.

- Priority 3 releases are generally low-volume releases but may include medium-volume releases if the operator has a good inspection history. In such cases, the EUB has a high degree of confidence that the release will be appropriately handled. Approximately 25 per cent of priority 3 spills are inspected by EUB staff.

If a pipeline failure/hit occurs, the licensee or operating company is required to inform the local EUB field centre. An EUB field representative records the information into a database, including date of occurrence, geographic location, pipeline specifications, operating conditions, environmental release information, appropriate cause code, and priority rating of the release.

Table 7 shows the various causes of failures and corresponding inspections during the 2000/2001 reporting year.

In summary, pipeline incidents from April 1, 2000, to March 31, 2001, were as follows:

Ruptures	4.1%	Priority 1 releases	1.7%
Leaks	89.6%	Priority 2 releases	14.4%
Hits, no release	6.3%	Priority 3 releases	77.6%
		No release	6.3%
	100%		100%

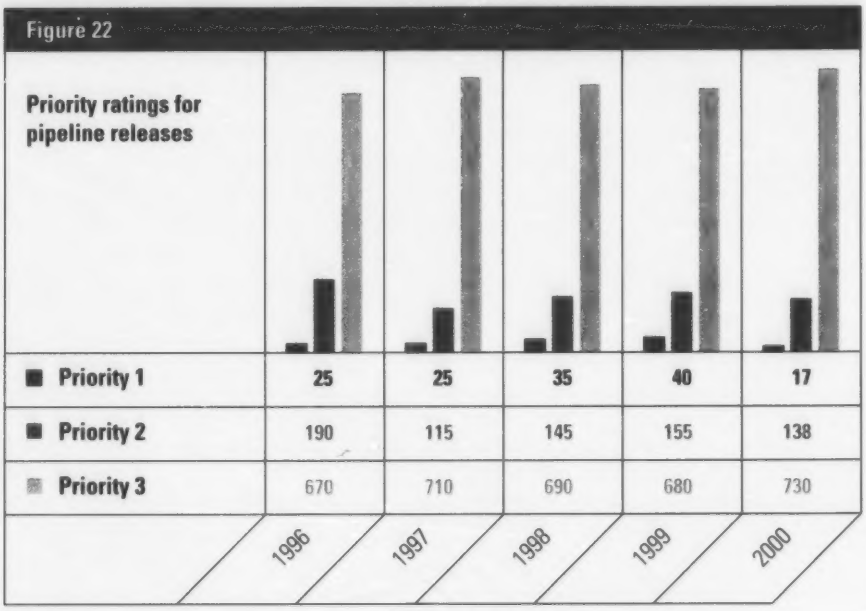
Of the total pipeline incidents reported during 2000/2001, 89.6 per cent were leaks, 4.1 per cent were ruptures, and 6.3 per cent were hits that did not result in a release. There were 39 ruptures in 2000/2001, compared to 44 ruptures the previous year. In addition, 77.6 per cent of reported releases were classified as priority 3, compared to 1.7 per cent that were classified as priority 1.

Table 7. Failures/hits reported from April 1, 2000, to March 31, 2001

Cause	Incidents #	Incidents %	Leaks	Inspections	Ruptures	Inspections
Internal corrosion	559	58.7	557	248	2	2
External corrosion	82	8.6	81	50	1	1
Weld corrosion	2	.2	2	2	0	0
Joint failure	18	2.0	18	4	0	0
Mechanical joint	12	1.2	12	8	0	0
Girth weld	11	1.1	10	5	1	1
Construction damage	48	5.0	44	29	4	2
Damage by others (hits with release)	37	4.0	18	14	19	16
Damage by others (hits, no release)	60	6.3	0	46	0	0
Earth movement	13	1.4	13	6	0	0
Mechanical damage	9	1.0	9	5	0	0
Fittings/valve failure	16	1.7	16	6	0	0
Installation failure	1	.1	1	0	0	0
Weld failure	6	.6	6	2	0	0
Seam rupture	8	.8	5	2	3	2
Pipe failure	21	2.2	17	9	4	4
Overpressure	13	1.4	10	7	3	1
Operator error	6	.6	5	3	1	0
Miscellaneous	11	1.1	11	8	0	0
Unknown	19	2	18	2	1	0
TOTAL	952	100	853	453	39	29
% OF INCIDENTS		100	89.6		4.1	

Figure 22 shows that the number of priority 1 releases has decreased. Sensitive leak detection systems, automated shut-in equipment, and pipeline patrols (aerial and ground) that are being used by industry are contributing to this decrease.

Figure 22



If the failure cause is unknown, EUB field staff require the operating company to perform an analysis on the pipeline system to prove integrity and mitigate further occurrences.

EUB field staff conducted 482 inspections in 2000/2001, focused primarily on corrosion-related failures. All failure incidents are reviewed with the company at the time of their notification to the EUB field centre.

Failures reported during 2000/2001 resulted in industry being required to do one or more of the following:

- undergo requalification pressure testing (of the 558 pipelines tested, 31 failed during the requalification pressure test)
- submit failure mechanism reports (463 were required to identify mechanism of failure)
- amend licences (155 amendments to replace or internally line the pipe with a new corrosion barrier or to abandon the line)
- other requirements
  - determine product flow velocities
  - conduct analysis of product shipped and received (sampling)
  - modify system to enable corrosion rate monitoring
  - install corrosion control devices (inhibitor injection probes, sacrificial anodes, impress current anodes)
  - conduct internal electromagnetic or ultrasonic inspections
  - conduct cathodic protection surveys
  - install pigging facilities
  - conduct risk assessments

Figures 23, 24, 25, and 26 are historical overviews of data compared to the most recent year reported.

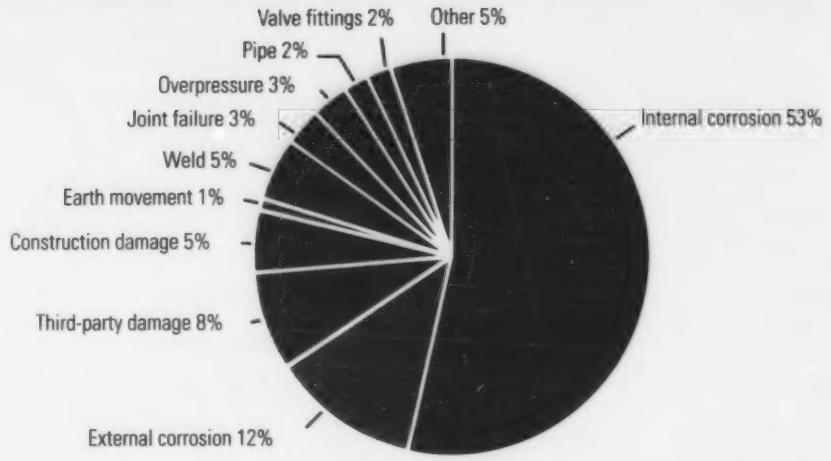
Figure 23 indicates that there has been an increase in internal corrosion in 2000/2001 compared to historical data. All other failure causes have remained relatively constant.

Figure 24 indicates that natural gas incidents are increasing compared to previous years. Most of the product failures are indicating a downward trend, as new nonmetallic materials are being used as corrosion barriers and technology improves in all areas of corrosion monitoring and mitigation. Further analysis indicates that the increase in incidents of internal corrosion correlates to the increase in natural gas failures. The failures are occurring primarily in the southeastern part of the province. These leaks are typically very small in volume and difficult to detect under normal operating conditions. Very sensitive gas detection equipment is used to pick up these leaks by aboveground surveys. The leaks, when exposed, are typically very small diameter pits.

Figure 23

Historical pipeline failures by cause (%)

1980 - March 31, 2001



Pipeline failures by cause (%)

April 1, 2000, - March 31, 2001

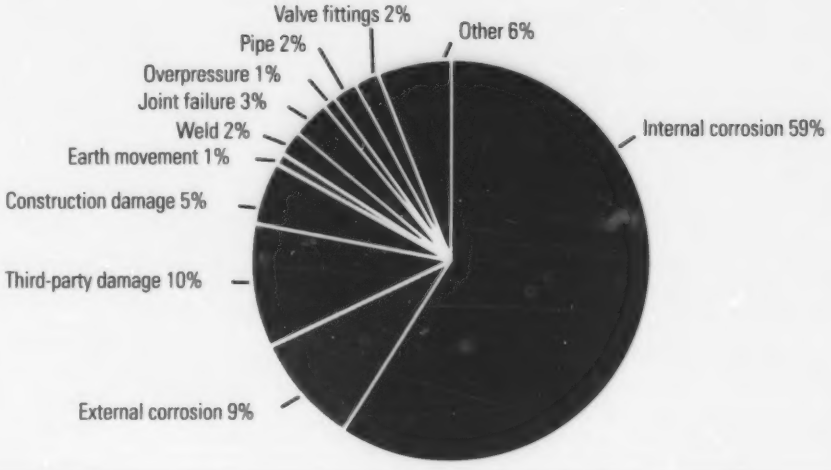
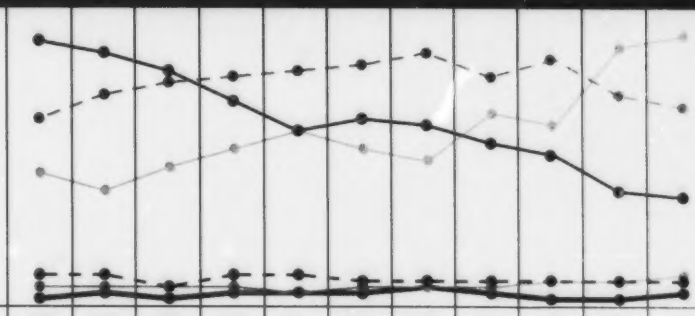


Figure 24

Historical pipeline incidents by product being transported



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/2001
Water	**336**	**303**	**279**	**233**	**221**	**204**	**224**	**194**	**196**	**162**	**159**
Multiphase	238	254	262	261	297	268	318	280	328	319	303
Crude	**28**	**29**	**17**	**26**	**31**	**20**	**25**	**20**	**28**	**31**	**29**
Sour gas	16	12	14	12	9	15	19	17	24	31	35
Natural gas	166	134	164	177	223	172	179	230	241	385	420
All other	**3**	**6**	**2**	**4**	**6**	**5**	**13**	**9**	**4**	**3**	**6**

Figure 25 indicates that the majority of failures are occurring in smaller-diameter gathering lines, primarily in 60.3 mm (2 inch), 88.9 mm (3 inch), and 114.3 mm (4 inch) systems.

The overall failure frequency in 1988 was in the range of five failures per 1000 kilometres (km). In 2000 the overall failure frequency has been reduced to approximately three failures per 1000 km and this is projected to continue on a downward trend (Figure 26).

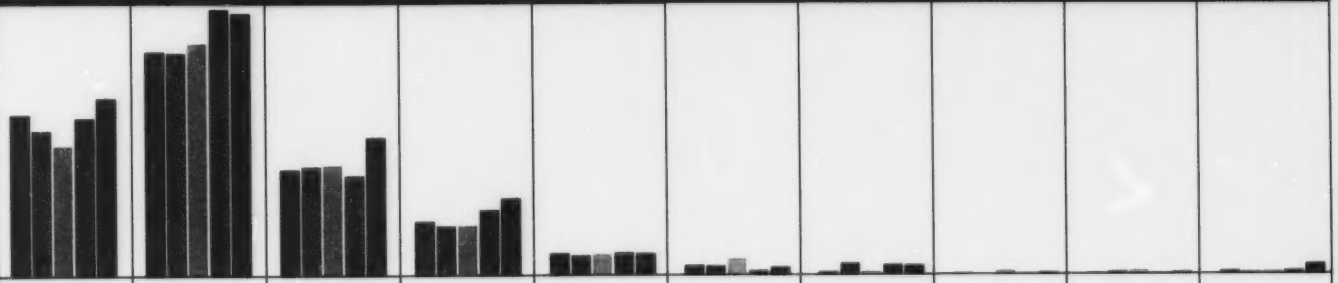
A number of organizations contribute considerable resources towards pipeline integrity, maintenance, operations, and safety. These include

- Alberta One-Call
- Canadian Association of Petroleum Producers (CAPP)
- Canadian Centre for Materials and Energy Technology (CANMET)
- Canadian Energy Pipeline Association (CEPA)
- Canadian Standards Association (CSA)
- National Association of Corrosion Engineers (NACE)

Regional, national, and international pipeline conferences and workshops are held frequently. As these groups share technology and information, their success is being demonstrated in the field through a reduction in pipeline failure frequency.

Figure 25

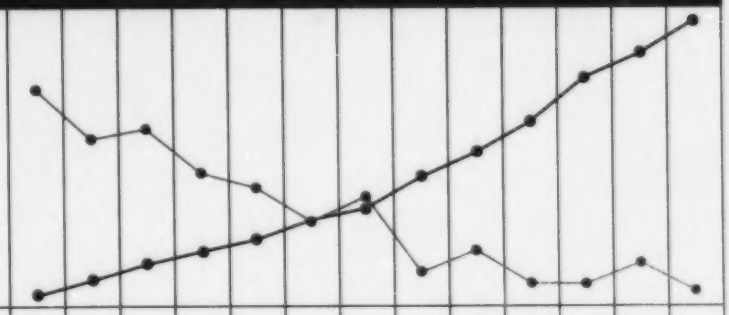
Historical pipeline failures, by line diameter, by all causes



	60.3mm (2")	88.9mm (3")	114.3mm (4")	168.3mm (6")	219.1mm (8")	273.1mm (10")	323.9mm (12")	355.6mm (14")	406.4mm (16")	>406.4mm (>16")
1996	195	271	128	65	26	11	3	1	1	3
1997	176	270	132	60	24	11	14	0	3	2
1998	158	282	134	61	26	20	4	5	5	3
1999	191	323	121	79	27	5	12	1	1	4
2000/2001	215	318	167	93	26	9	11	2	2	12

Figure 26

Historical failure incidents compared to total pipeline length



	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Length of pipeline (1000s of km)	149	157	166	173	179	189	195	212	224	241	264	276	294
Ratio (failures/1000 km)	5.16	4.63	4.74	4.27	4.12	3.77	4.03	3.23	3.47	3.12	3.11	3.33	3.04

EUB Action

- Field Surveillance staff will continue to investigate 100 per cent of first-time corrosion system failures when the failure mechanism is unknown.

- Pipeline corrosion continues to be an area of focus due to the number of failures. The EUB investigation of failures requires a laboratory analysis of the failed pipeline segment if there has been no previous inspection history. Companies must implement recommendations from these assessments to mitigate future occurrences of pipeline corrosion.

- The EUB is concerned about the increase in corrosion failures on low-pressure sweet natural gas systems in the southeastern part of the province. The EUB is supporting the recently formed synergy group to address this problem.

5.3 Construction and Testing Inspections

Provincially EUB field staff inspected 298 companies for a total of 607 pipeline construction/test inspections in 2000/2001. Of these, 503 were satisfactory inspections, 91 minor unsatisfactory inspections, and 13 major unsatisfactory inspections. There were no serious unsatisfactory inspections during 2000/2001. All unsatisfactory inspections items were addressed by industry.

- Minor unsatisfactory inspection items
  - Pipeline applications did not reflect proper information (pipe size, wall thickness, grade of pipe, and correct routing to and from locations). Note that in all cases the materials actually used exceeded requirements. Amendments were required to correct the pipeline applications.

- Major unsatisfactory inspection items
  - Wall thickness of pipeline at road crossings was improper.
  - Pipeline girth welds were not 100 per cent radiographed for sour service.

- An existing pipeline was hit during construction and the company failed to report the incident to the EUB.
- Pipeline was marked in the wrong location; hand excavation should have been done to verify the correct location.
- Foreign pipelines were not marked and work progressed in controlled area.
- Machinery was working within 60 cm of pipeline without supervision.

EUB Action

- Based on the pipeline inspection criteria, EUB field staff will continue to inspect new pipeline installations. The EUB will continue to ensure that industry is aware of regulatory requirements and the consequences of noncompliance.

5.4 Operations Inspections

In 2000/2001 EUB field staff conducted operations inspections on 52 companies and inspected 275 different systems. These detailed inspections involve a field inspection of the pipeline system and a records review of maintenance documentation. The results were 95 satisfactory inspections, 159 minor unsatisfactory inspections, and 21 major unsatisfactory inspections. There were no serious unsatisfactory inspections during 2000/2001. All unsatisfactory inspection items were addressed by industry.

- Minor unsatisfactory inspection items
  - Signage was missing, defaced, or had incorrect company contact phone numbers.
  - Record updates to indicate proper operating status of pipeline were incomplete.
  - Documentation of right-of-way patrols was not complete.

- Major unsatisfactory inspection items
  - Emergency procedures manual information was incorrect.
  - Valves/fittings or flanges were not properly rated for pressure of system.
  - Cathodic protection surveys were not performed.
  - No cathodic protection or internal corrosion monitoring was in place.

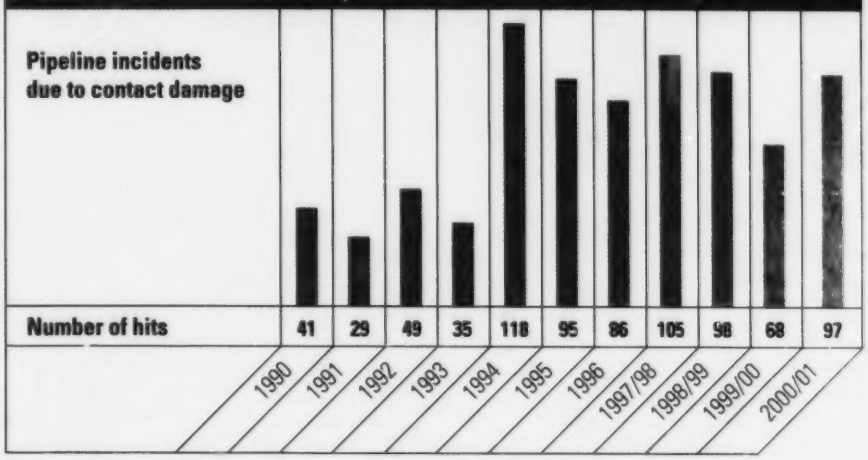
EUB Action

- EUB field staff will continue to conduct operations inspections in 2001/2002. The EUB is concerned about operators' failure to submit licence transfers and amendments. This results in inaccurate pipeline data as to ownership, signage, emergency contacts, and operation status and weakens the overall integrity of pipeline systems. EUB field staff will focus on rectifying these issues.

5.5 Contact Damage

The goal of this inspection area is prevention of pipeline damage (hits). If a company does not follow ground disturbance regulations, the EUB will impose enforcement guidelines for noncompliance, as detailed in *IL 99-4*. There were 97 contact damage incidents recorded in 2000/2001 (see Figure 27). Of these, 35 incidents were found to have major noncompliance items and 3 had serious noncompliance items. The remaining 59 incidents could not be accurately categorized. (The new pipeline inspection manual currently being drafted will address this issue.)

Figure 27



EUB field staff conducted 53 ground disturbance seminars for companies in violation of requirements. In addition, a further 58 seminars were held for educational purposes, with approximately 1360 people from industry and the public attending.

In addition to the EUB, other organizations work diligently to prevent pipeline and utilities damage. Of particular note is the Edmonton Area Pipeline and Utilities Operators' Committee (EAPUOC), which organizes and facilitates communication among owners of buried pipelines, utility installations, emergency responders, and regulators in the event of an emergency. Each year EAPUOC organizes an emergency training exercise and a safety seminar for the general public and industry.

EUB Action

- The EUB will continue to focus on educating parties that have been involved in pipeline hits in an effort to reduce the potential for future incidents. Ground disturbance certification is being proposed by the EUB Field Surveillance Branch to reduce contact damage by the oil and s industry.

Beaver dam in northern Alberta

6 Environment

6.1 Introduction

One of the most important responsibilities of the EUB is the protection of the environment. EUB field staff have developed both internal and collaborative processes with other agencies in an attempt to minimize environmental impacts from industry operations. The Field Surveillance Branch has inspectors in each of the field centres with specific responsibilities related to spill, drilling waste, and waste management facility inspections. In addition, Field Surveillance utilizes a mobile air quality monitoring unit to enhance inspections where fugitive emissions are suspected.

6.2 Spills and Releases

6.2.1 Spill and Release Statistics and Inspections

A key goal of the EUB is to minimize the effects of spills regardless of where they occur. To ensure the most efficient and effective response, Alberta Environment (AENV) and the EUB developed a memorandum of understanding that outlines the response requirements of industry when a spill occurs. EUB *Informational Letter (IL) 98-1: A Memorandum of Understanding between Alberta Environmental Protection and the Alberta Energy and Utilities Board Regarding Coordination of Release Notification Requirements and Subsequent Regulatory Response* defines these roles and responsibilities.

The ideal situation would be the elimination of all spills. However, the EUB's goal is to minimize the effects of spills and releases by working cooperatively with industry and other regulators. To accomplish this the EUB requires a multistep approach:

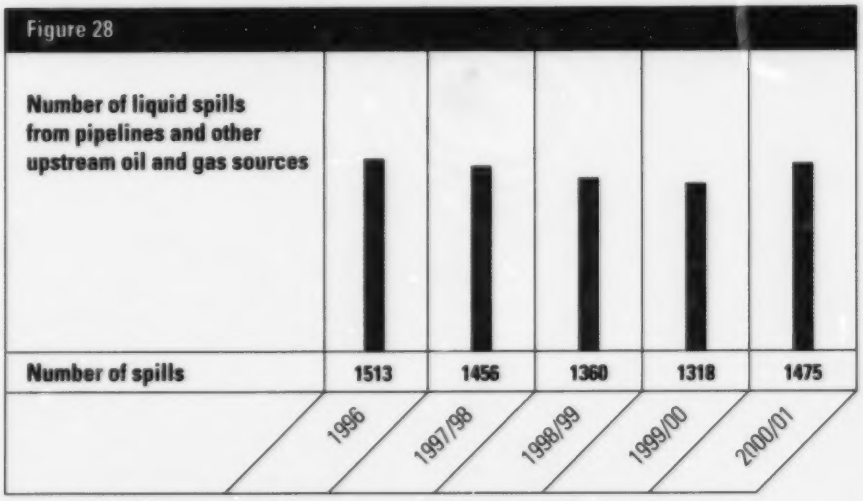
- the source must be stopped,
- the spill must be contained,
- the free fluids must be recovered, and
- the spill site must be remediated in accordance with AENV guidelines.

As stated in Section 5.2, releases must be reported to the EUB to allow for an appropriate, timely, and effective response:

- Priority 1 releases pose the threat of serious environmental and public impacts and are inspected immediately. In most cases EUB field staff respond; however, in situations where it is virtually impossible for an EUB staff person to inspect the site immediately, all attempts are made to have another regulatory agency respond. In such cases, the EUB will conduct an inspection as soon as it can. EUB staff inspect 100 per cent of priority 1 releases.
- Priority 2 releases are generally mid- to high-volume releases but may include low-volume releases if the operator is new or has a poor inspection history. These releases are generally inspected by EUB staff within 10 working days.
- Priority 3 releases are generally low-volume releases but may include medium-volume releases if the operator has a good inspection history. In such cases, the EUB has a high degree of confidence that the release will be appropriately handled. Approximately 25 per cent of priority 3 spills are inspected by EUB staff.

A comparison of the number of liquid spills since 1996 is provided in Figure 28. As shown, a total of 1475 releases were reported to the EUB's eight field centres in the past year, an increase from 1318 in the previous year. Of those,

Figure 28



- 28 were priority 1 (2 per cent),
- 371 were priority 2 (25 per cent), and

- the remaining 1076 were priority 3 (73 per cent).

It is important to note that more than 70 per cent of the spills were low volume and were usually contained on lease. Inspections were conducted on 752 spills and releases. There were 711 satisfactory spill inspections, 29 minor unsatisfactory spill inspections, 12 major unsatisfactory spill inspections, and no serious unsatisfactory spill inspections (see Section 1.3 for definitions of satisfactory inspection and minor, major, and serious unsatisfactory inspections).

EUB Action

- The number of liquid releases could be reduced if industry improved maintenance and pipeline corrosion control programs. The EUB continues to work with industry towards those goals.

- EUB staff will focus on ensuring compliance with EUB *Guide 55: Storage for the Upstream Petroleum Industry*, as well as on education and awareness of operators (including preventive maintenance).

6.2.2 Main Causes of Releases

Pipeline corrosion, equipment failure, and operator errors were the leading causes of liquid releases in 2000/2001. Sources in the "other" category included trucks, trucking facilities, central treating facilities, and drilling waste sumps. Figure 29 shows the most significant sources and causes of releases and clearly indicates that industry must be more effective with its preventive maintenance and corrosion control programs.

Figure 29

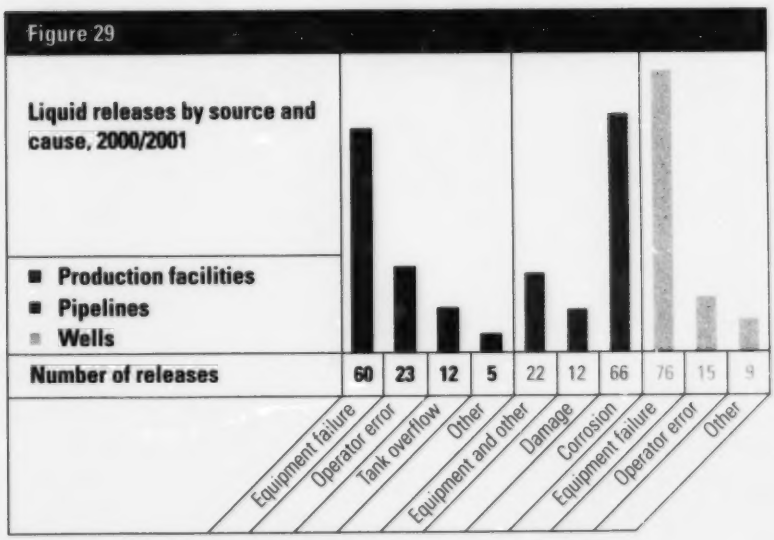
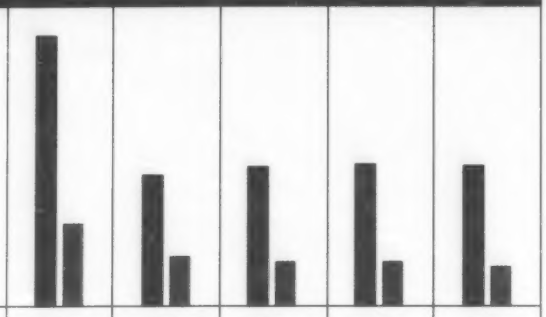


Figure 30 provides the volume of oil and produced water spills over a five-year period. The spill volumes of hydrocarbon and produced water for 2000/2001 were 6469.1 cubic metres (m^3) and 22 874.0 m^3 respectively. This is a reduction from 1999/2000 release volumes of 7247.1 m^3 hydrocarbon and 23 116.7 m^3 produced water.

Figure 30

Reported volumes of oil and produced water spills (1000s of m^3)



	1996	1997/98	1998/99	1999/00	2000/01
Produced water	44.2	21.4	22.7	23.1	22.9
Oil	13.5	8.1	7.3	7.3	6.5

6.2.3 Release Prevention

Spill response training exercises ensure that industry personnel are adequately trained to effectively respond to spills and therefore minimize the impact on the environment and the public.

In 2000/2001, EUB staff attended 19 oil spill cooperative training exercises and gave presentations on

- release statistics,
- release reporting requirements, and
- regulatory changes and updates.

These presentations have a provincial focus but are also tailored to address local issues and concerns. Field staff have received positive feedback regarding their involvement and accordingly will continue to participate.

EUB Action

- The EUB is a strong supporter of the spill cooperatives and regularly participates with groups such as the Western Canadian Spill Services (WCSS) to enhance spill preparedness. The EUB takes the opportunity at meetings and spill exercises to communicate the importance of spill prevention.

6.3 Mobile Ambient Air Quality Monitoring

6.3.1 The EUB's General Approach to Monitoring

Field Surveillance uses an ambient air monitoring unit to track and assess fugitive emissions.

The unit is equipped with analyzers capable of reading and recording hydrogen sulphide (H_2S) and sulphur dioxide (SO_2) emissions. This equipment allows EUB staff to conduct mobile and stationary ambient air monitoring throughout the province.

Mobile monitoring allows greater mobility to detect, monitor, and evaluate fugitive emissions from a facility. When fugitive emissions are detected, the unit's capabilities allow the operator to track the plume, obtain representative air samples, and determine the location of the source and if the ambient air guidelines have been exceeded.

Stationary monitoring refers to setting the unit in a stationary position, usually not staffed, for a period of more than six hours. Stationary monitoring is conducted to detect emissions that may occur intermittently at a given location.

6.3.2 Routine and Complaint Response Monitoring

The following criteria are considered when deploying the mobile monitoring unit:

- complaints from residents
- sour facilities with a history of problems
- newly constructed sour facilities
- new operators/licensees of sour facilities

In 2000/2001 EUB staff monitored 28 facilities for H_2S and SO_2 emissions. Nine facilities were found to have off-lease emission problems (32 per cent, compared with 14 per cent in 1999/2000). Immediate corrective action was taken at all 9 facilities, and in some cases facility operations were suspended.

The most common sources of emissions were leaking tank hatches and ineffective vapour recovery units.

As well as carrying out routine monitoring and responding to complaints, the mobile monitoring unit may be used in emergency response situations. The monitoring unit was not required in an emergency situation in the 2000/2001 reporting year.

EUB Action

- The report of the Advisory Committee on Public Safety and Sour Gas recommended that "the EUB enhance its capability to conduct monitoring as part of its complaint response and compliance programs." The EUB will be hiring a full-time operator for the existing unit and is considering a second unit to enhance its air monitoring capability.
- The EUB will continue to use the criteria outlined above to identify and prioritize facilities for air quality monitoring.

6.4 Waste Management Initiatives

6.4.1 Waste Management Facilities

The new EUB *Guide 63: Oilfield Waste Management Facility Inspection Manual* was released in 2000/2001. This guide had extensive field testing completed last year, which also gave waste management facility operators an opportunity to become aware of EUB expectations and requirements.

There are 55 active oilfield waste management facilities registered with the EUB. In 2000/2001, 56 field inspections were conducted, 5 of which were audit/inspections. An audit/inspection combines a review of company accounting records with a facility inspection. The results of the inspections (and audit/inspections) yielded 28 satisfactory inspections, 23 minor unsatisfactory inspections, 4 major unsatisfactory inspections, and 1 serious unsatisfactory inspection. Odours, record keeping, and measurement were the most common problem areas identified. All facilities were brought into compliance.

EUB Action

- Facility inspections will continue in 2001/2002, with the focus on poor operator history (facilities that received a major unsatisfactory inspection in 2000/2001 will be the highest priority).
- Audit/inspections are scheduled for 8 facilities in 2001/2002.
- Education and awareness are integral to how the EUB conducts its business. Accordingly, EUB field staff will continue to meet with facility operators during their inspections to ensure a complete understanding of EUB requirements.

6.4.2 Drilling Waste Management

In 1996 the EUB issued *Informational Letter (IL) 96-13* and a revised *Guide 50: Drilling Waste Management,* identifying the three agencies responsible for regulating Alberta's drilling waste management:

- EUB – private land,
- Public Lands (Agriculture, Food and Rural Development [AFRD]) – public land white area, and
- Land and Forest Service (Alberta Environment [AENV]) – public land green area.

In 1999/2000 a common document was developed by all three agencies to ensure a consistent approach to drilling waste management. In early 1999, an EUB drilling waste audit/inspection team was formed to further develop specific audit/inspection criteria for the EUB.

During 1999/2000 the drilling waste audit/inspection team concentrated their efforts on the development of inspection criteria for drilling waste disposal sites. In 2000/2001 EUB field staff used the draft inspection guide to field test its application. As a result of the field test, revisions have been made to the draft guide and it will undergo a final field test prior to being published in 2001/2002.

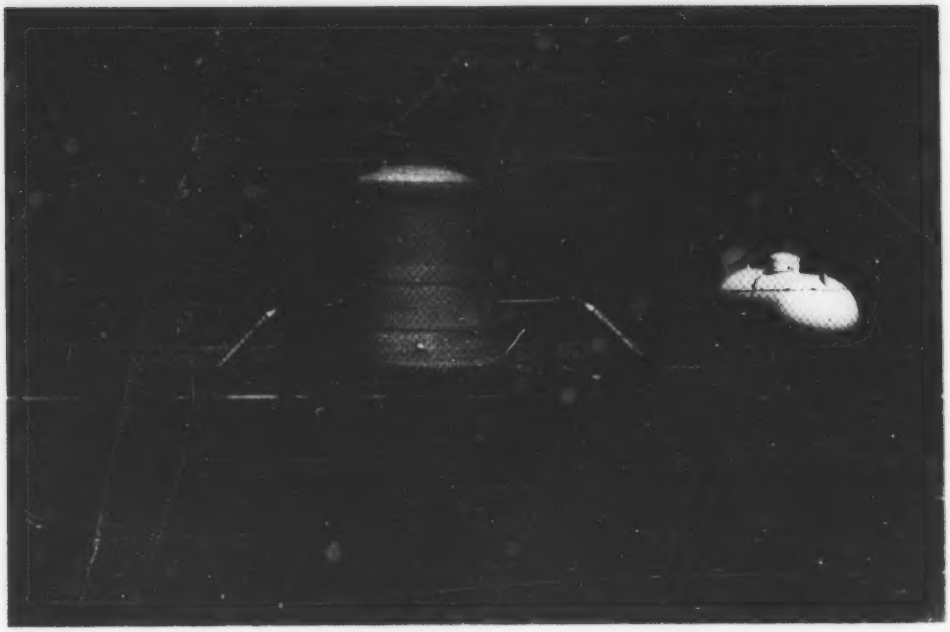
Drilling waste disposal methods are identified in EUB *Guide 50* as being either routine or nonroutine. In 2000/2001, 91 nonroutine drilling waste sites were inspected. Of those, 86 per cent were satisfactory inspections, 10 per cent were minor unsatisfactory inspections, and 4 per cent were major unsatisfactory inspections. All of the unsatisfactory inspection items have been brought into compliance. Sites that recorded unsatisfactory inspection items in 2000/2001 will be targeted for inspection again in 2001/2002.

In 2000/2001, 169 routine drilling waste disposal inspections were conducted. Of those, 75 per cent were satisfactory inspections and 25 per cent were unsatisfactory inspections. The unsatisfactory inspection items were not classified as minor, major, or serious, but these classifications will be incorporated in the forthcoming inspection guide.

EUB Action

- The EUB Operations Group has created an inventory of invert (oil-based) drilling waste treatment sites on private lands in Alberta. Inspections and audits will again be focused on these sites in 2001/2002.

- The final draft of the drilling waste inspection guide will be field tested in the summer and fall of 2001, and the guide will be completed by the EUB Operations Group in 2002.



Water disposal well inside protective cover, Millarville area

7 Packer Isolation Testing and Reporting

7.1 Introduction

The testing and reporting requirements for all wells that require a production packer are outlined in EUB *Informational Letter (IL) 94-18: Isolation Packer Tests—Testing and Reporting Requirements*. Annual isolation packer tests are required on all wells that inject fluids other than potable water and on all flowing sour gas wells greater than 5 per cent hydrogen sulphide. Companies must submit test results to the EUB on an annual basis. Wells that fail must be repaired and retested and the retest results submitted to the EUB.

The goals of the EUB's Packer Isolation Testing Program are to

- maintain isolation between the fluid being injected/produced and the primary casing string by ensuring that these wells are satisfactorily tested, repaired, properly suspended, or abandoned within the reporting year, and
- ensure industry awareness, understanding of, and compliance with these requirements.

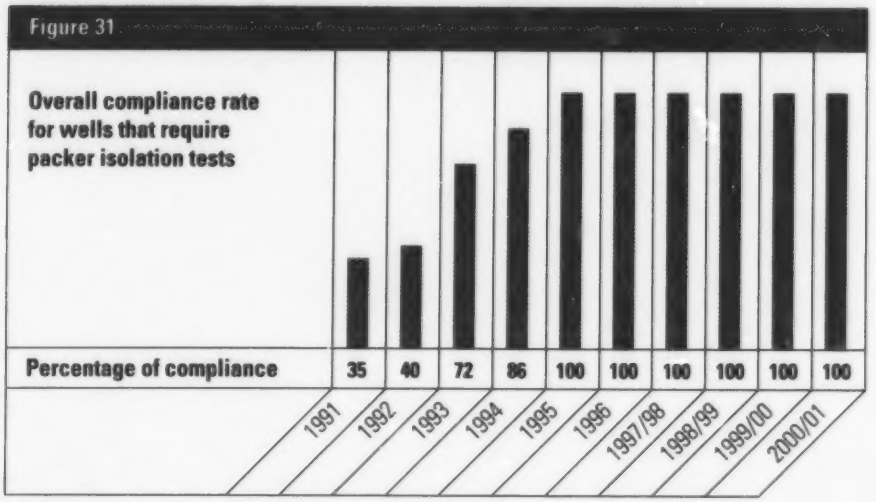
7.2 Inspection Results

The 2000/2001 reporting year started with an inventory of 8195 wells that required testing and reporting under EUB requirements.

Enforcement action was taken on 1049 wells (216 companies) for failing to conduct or submit packer isolation test results by the September 1, 2000, deadline date. All wells were brought into compliance; therefore no closure or abandonment orders were issued.

Figure 31 shows a 100 per cent compliance rate, as all 8195 wells were satisfactorily tested, repaired, suspended, or abandoned within the reporting year. This compliance rate has been consistent since 1995.

Figure 31



EUB Action

- The EUB will continue to provide a process to ensure that industry is aware of and accountable for meeting the packer isolation testing and reporting requirements. Effective April 2, 2001, this program was transferred from the EUB Field Surveillance Branch to the EUB Compliance and Operations Branch and will no longer be summarized in this report.